The OIL AND GAS JOURNAL

ST. PAUL
AUG 4 1945

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WIGGINS PONTOON ROOF TANK handles a BUTANE-GASOLINE MIXTURE without excessive evaporation loss!

The photo at the right shows a 25,000-bbl. tank with a Wiggins Pontoon Roof of the high deck type. This tank, located at a pipe line station, is used to store a 12-lb. gasoline and butane mixture.

Originally installed to handle 12-lb. gasoline, the 25,000-bbl. Wiggins Pontoon Roof tank shown above is now being used for storing a mixture of 12-lb. gasoline and butane. A recent check on the operation of this floating roof revealed that during extremely hot days a small amount of venting takes place. *This venting, however, is not excessive at any time and the vapor loss is negligible.* (Wiggins Pontoon Roofs are not recommended for use on tanks storing products that boil at atmospheric temperature. However, at this location, the Wiggins Pontoon Roof tank prevents most of the evaporation loss even though it is being used for a service for which it was not intended.)

Wiggins Pontoon Roofs are used extensively to redu evaporation losses from tanks handling crude or refin petroleum products. Here, briefly, is what they accomplis They prevent all filling losses and practically all breathi losses by eliminating the active vapor space in tanks. Th reduce boiling losses by trapping vapor formed below t liquid surface and retaining it until cooler temperature cau reabsorption. They reduce fire hazard by eliminating con tions which might permit tank contents to burn.

Write our nearest office for quotations on Wiggins Po toon Roofs for new or existing tanks. Also ask for Bulletin which describes the Wiggins Pontoon Roof in detail.

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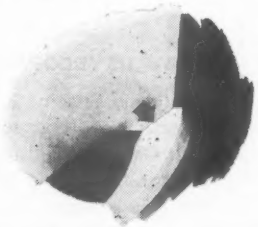
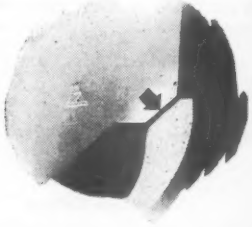
USE THIS *Free* WEAR GAGE TO DOUBLE THE LIFE OF YOUR MISSION *Slush Pump* VALVES

CHECKING THE VALVE SEAT FOR BUSHING WEAR . . .



TIME TO CHANGE BUSHING

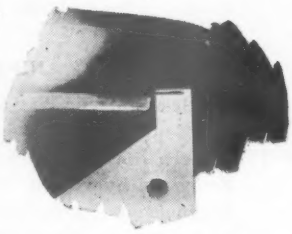
When the wear gage touches the sealing surface of the valve seat, as shown here, the bushing is worn and should be changed.



NEW BUSHING INSTALLED

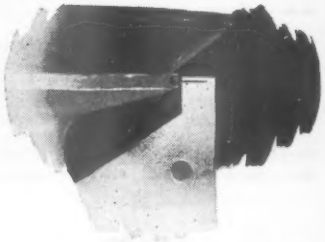
Notice how the wear gage stands away from the sealing surface of the valve seat when the bushing is in good condition. This means long, trouble-free service ahead.

CHECKING THE VALVE BODY FOR WEAR . . .



GAGING A WORN BODY

When the line on the wear gage is above the surface of the valve body as shown here, the body is worn and should be changed.



HOW GAGE APPEARS ON A NEW BODY

Notice how the line is now well below the surface of the body. Prompt changing of worn valve bodies results in long insert life and greatest freedom from valve troubles.

By replacing worn bushings and worn valve bodies when needed you can double the life of your Mission Valves and assure maximum valve insert life. Start getting longer, trouble-free service from your valves by asking your supply store . . . or writing us for this **FREE** wear gage.

5A 2

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Trends

Crude-Oil Production
By States—Page 122

CRUDE-OIL STOCKS 218,108,000 bbl. as of July 21—up 1,763,000 bbl. One year ago 225,294,000 bbl.

GASOLINE STOCKS 85,930,000 bbl. as of July 21—up 529,000 bbl. One year ago 80,768,000 bbl.

RESIDUAL FUEL-OIL STOCKS 42,480,000 bbl. as of July 21—up 991,000 bbl. One year ago 55,744 bbl.

GAS OIL AND DISTILLATE STOCKS 35,458,000 bbl. as of July 21—up 654,000 bbl. One year ago 37,216,-000 bbl.

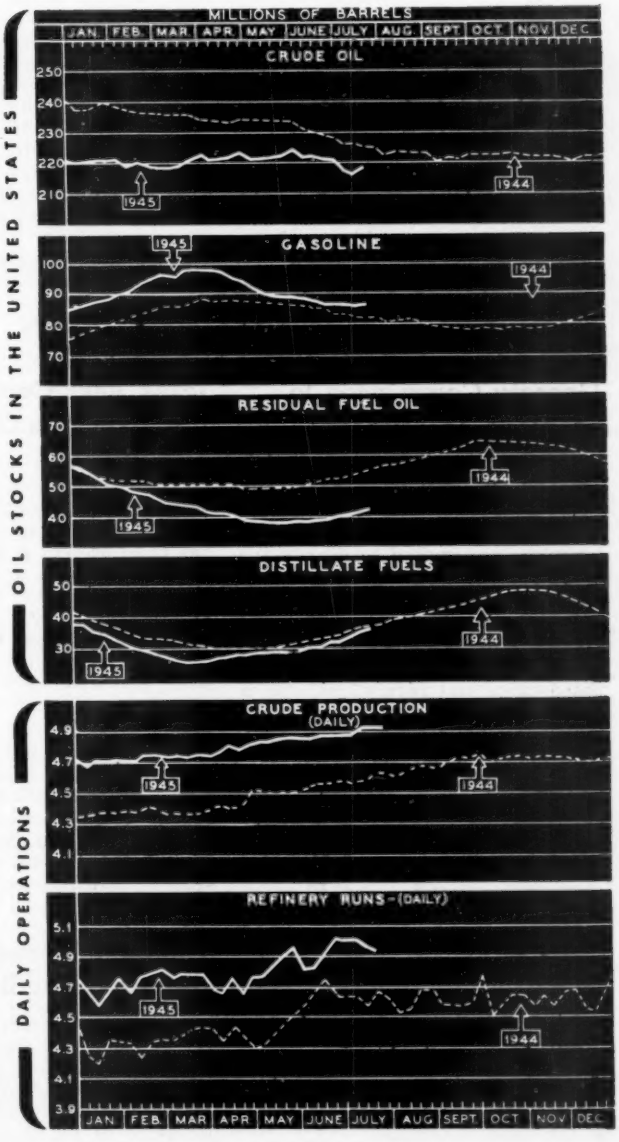
CRUDE-OIL PRODUCTION 4,928,200 bbl. as of July 28—down 11,400 bbl. One year ago 4,617,450 bbl.

REFINERY RUNS 4,927,000 bbl. daily week ended July 21—down 18,000 bbl. One year ago 4,677,000 bbl.

ANOTHER record was established last week in well completions. The United States total of 596 was 5 greater than the year's previous peak established in mid-July. The significance of another completion record, however, is chiefly because it was established after several weeks during which the impression had gained wide circulation that drilling was declining. There is no doubt that some companies have scaled down their drilling programs for the last 6 months. But the Journal's midyear projection of field activity in the July 28 issue and the current rate of completions indicate that increases by many companies and reduced drilling time with newer rigs will more than offset scattered curtailment.

CRUDE-OIL production is virtually static at approximately 4,930,000 bbl. daily. Inclusion of natural gasoline, condensate and allied products, lifts the domestic output to more than 5,200,000 bbl. per day. Only moderate changes are recorded from week to week in crude-oil stocks despite near-record domestic production and increasing imports. Record refinery operating levels are unproductive of substantial changes in stocks of refined oils. There is little doubt that fuel-oil supplies will be acutely short in the Middle West and eastern states during the coming winter, unless the Pacific war should end in the near future. Shortages will be most pronounced in home heating and residual fuel oils which are lagging behind the normal rate of summer accumulation in the areas of high consumption.

THERE are indications that tankers for importing foreign crude are more plentiful now than they will be after completion of military redeployment in the Pacific later this year. The Petroleum Administration for War has warned eastern consumers and operators that coastwise tankers now moving several thousand barrels of petroleum daily from the Gulf Coast to Atlantic terminals will be diverted when they are needed to handle military supplies. Statements concerning tankers in foreign trade are less positive but there is little doubt that they too will be assigned to military service in substantial numbers if the Jap war is prolonged. Added up, conditions indicate that not only will the domestic industry be asked to continue current record operations but it may be called upon for larger crude supplies, higher refinery operations, and more transportation.



California Spacing Rules Are Relaxed to Secure Crude

WASHINGTON.—To meet the mounting demands for California crude oil for war requirements in the Pacific, the Petroleum Administration for War announced substantial relaxations in the spacing requirements for numerous California fields, effective July 28.

The action was taken by amending Supplementary Order 4 to Petroleum Administrative Order 11, the most important change being a revision of Exhibit A of the order. This lists California pools by name and specifies well spacing regulations for each, including many cases separately defined pay zones in various fields with specific spacing regulations for each zone.

New Pools in Exhibit A

New pools have been added to Exhibit A, and some previously classified as single pools have now been divided into more than one pool. In addition, the order has been amended to provide minor relaxations of boundary line limitations for new wells on 5-acre spacing, and to remove restrictions on installation of pumping equipment in existing fields.

The revised schedule gives specific spacing for 243 fields or pools, leaving 41 subject to special treatment. Only 6 of the 243 pools or zones having specific spacing requirements are now required to be drilled on 40-acre units, 39 have 20-acre units, 124 may now be drilled on 10-acre units, and 74 are to be permitted to go as low as 5-acre spacing.

By districts, the new regulations permit the following spacing: In the Los Angeles Basin, 28 pools have 5-acre spacing, 43 have 10-acre spacing, 7 have 20-acre spacing, 3 are still on 40-acre spacing, while 8 are subject to special regulation. In San Joaquin Valley, 40 pools have 5-acre spacing, 19 have 10-acre spacing, 18 have 20-acre spacing, 3 have 40-acre spacing, and 21 are subject to special regulation. In the Coastal area, 6 pools have 5-acre spacing, 62 have 10-acre spacing, 14 have 20-acre spacing, none has 40-acre spacing, but 12 are still subject to special regulation.

Georgia Commission to Discuss Conservation Rules

WAYCROSS, Ga. — The second open meeting of the Georgia Oil and Gas Commission will be held here August 27 at which time all oil operators are invited to discuss the proposed rules and regulations governing the conservation of oil and gas in the state.

Copies of the new state law, passed March 9, 1945, of the proposed rules and regulations, and a transcript of the discussions at the first open meeting June 26 have been mailed to all parties requesting same, and others may obtain them by writing the commission at Waycross.

Both the law and the proposed regulations are largely based on conservation statutes and rules of Arkansas. However, the commission has expressed a desire to consider all suggestions from oil men before making the regulations effective. To aid this work, it has requested that suggestions or criticisms be filed in writing with the commission on or before August 17. This will give the members 10 days before the meeting to consider what problems seem to be the most important.

Ickes Asks Certification On Argentina Oil Cargoes

WASHINGTON.—A demand that all requests for permits to ship petroleum to Argentina be accompanied with adequate justification has been presented to the Office of War Mobilization and Reconversion by Secretary of the Interior Harold L. Ickes.

He told his press conference that this demand was made more than a week ago and he has not yet received a reply, but that no oil has been shipped.

It is understood that the only oil so far shipped to Argentina was one tanker load of Caribbean fuel oil in exchange for an equivalent amount of linseed oil, a deal made very shortly after Argentina declared herself one of the United Nations.

Drilling Increase Raises Phillips Expenditures

An increase of more than $5,000,000 in capital expenditures during the first 6 months of 1945 was reported last week by Phillips Petroleum Co. Out of total capital expenditure of $33,576,000 during the first half year, 83 per cent was spent for further enlargement of the company's crude-oil and natural-gas reserves by acquiring additional leases and drilling 328 wells.

During the first 6 months of 1944, Phillips' capital expenditures totaled $28,381,000 with 60 per cent applied for leases and the drilling of 170 wells.

The company reported 20 drilling wells under way at West Edmond and referred to bright prospects in the South Tyler and TXL pools in Texas.

Out of 2,772 company employes entering military service, 220 discharged veterans have returned to the Phillips organization.

House Approves Move to Validate Tideland Titles

WASHINGTON.—A resolution affirming the title of the 48 states to all coastal and submerged lands, including the oil and other rights, has been favorably reported by the House judiciary committee.

The resolution (H.J. Res. 225) was rewritten from 17 somewhat similar resolutions introduced by various members of the House, and the committee's report was unanimous. Further action is not expected until fall, following the congressional recess.

The bill would have the effect of nullifying the suit recently filed by the Department of Justice to void leases issued by the State of California for oil production off the coast near Los Angeles, and would put an end to all other attempts to question state ownership of submerged lands.

Gas-Injection Program for West Pampa Planned

AUSTIN.—A hearing will be held by the Texas Railroad Commission August 7 on the application of West Pampa Repressuring Association to install gas-injection facilities in the West Pampa area and for special rules governing the area in the Panhandle field.

Gulf Coast Gasoline Stocks Dip in First Half of July

HOUSTON.—Stocks of all grades of gasoline and naphthas dipped in the first half of July at plants in Gulf Coast Refiners Association, totaling 1,747,762 bbl., down 64,946. Automotive gasoline stocks dropped 7,380 bbl. to a total of 687,481. Total stocks of all products were 3,681,506 bbl. at the close of July 15, up 301,054. A year ago the total was 2,894,539. Crude runs 148,303 bbl. daily.

Selection of Venezuela Refinery Site Result of 2-Year Study

CARACAS.—Selection of Turiamo, in the State of Aragua, Venezuela, as the site of a new $50,000,000 refinery to be built by Creole Petroleum Corp. followed nearly 2 years of detailed study by civil engineers, doctors, refinery engineers, topographical crews, marine engineers and petroleum economists, the company revealed after Ministro de Fomento Dr. Luis Herrera Figueredo announced the government's agreement to the choice of site.

Crude oil from both eastern and western Venezuela will be received by tanker. Turiamo is approximately 400 km. west from Puerto La Cruz, pipe-line terminal of many eastern oil fields, and approximately 560 km. east from Lake Maracaibo by water. It is suitably situated therefore to utilize both eastern and western crudes with equal facility, and will be in position to meet changing market requirements through processing of various crudes.

"Our studies had a two-fold purpose," Arthur T. Proudfit, president of Creole, explained. "First, it was essential that the new refinery be placed where it can operate efficiently and can produce products from Venezuelan crude at a price that will make them strongly competitive in the world markets. This is vital, since the output of this and the other new refineries to be built in the country will greatly exceed Venezuela's own needs, and the success of the refinery will depend, for the most part, on the demand for its products in foreign markets."

Proudfit pointed out that $10,000,000 of the $50,000,000, which the project will cost will be spent for homes for employes, schools, a hospital, sports fields, clubhouses, shopping facilities and necessary roads.

With the site selected, plans for construction are being pushed. It is anticipated that actual work on the location will begin before the end of the year. This will involve clearing of the site, building of roads, and of numerous facilities that will be required in the building of the refinery itself. It is expected that the refinery will produce products 2 years from the time that work first begins on the plant, providing materials are received as required.

The refinery will have a capacity to process at least 40,000 bbl. of Venezuelan crude oil a day. It will produce a variety of products, including aviation gasoline, motor gasoline, kerosene, industrial lubricants, automotive and marine diesel fuels, lubricating oils of all types, greases, industrial and marine bunker fuels, and asphalts.

The equipment will be the most modern known at the time it is installed and will include a fluid catalytic cracker. This type of plant, developed just at the beginning of the war, has supplied more than one-half of all the billions of gallons of 100-octane aviation gasoline used by the United Nations' air forces. The fluid catalytic cracker to be built at Turiamo will incorporate the many improvements that have been made in this type of plant as a result of wartime operations.

To serve the refinery, storage tanks which will hold a total of 4,000,000 bbl. will be erected. An electric power plant and a water-treating plant also will be required.

Gulf Gasoline Tightness Slows Eastern Deliveries

WASHINGTON.—A shortage of civilian gasoline for movement from the Gulf Coast may result in bringing gasoline stocks along the Atlantic seaboard down to the 1944 level during August, Deputy Petroleum Administrator Ralph K. Davies said last week.

Davies said that the civilian supply of other petroleum products in the Gulf Coast refining area is also tight because of high military petroleum requirements.

Although military requirements are high, shipments of kerosene into the East Coast states have been normal during the summer weeks, and stocks are building up gradually to the 1944 level.

Low stocks in the Gulf Coast area coupled with the temporary availability of ocean-going tankers, Davies said, makes it likely that tank-car deliveries to the Atlantic seaboard will soon decline to an average of less than 300,000 bbl. daily. He added that pipe-line movements into the eastern states are expected to be less than normal during the time the additional tankers remain available.

In attributing the tightness of civilian petroleum supplies to high military requirements, Davies explained that this was the case in spite of the fact that crude-oil production and refining operations are at record levels in United States.

Spacing Pattern for New Kansas Field Announced

CHICAGO. — Locations in the northeast or southwest quarters of a quarter-quarter section were announced as the specified optional spacing pattern in the Carroll field of Barton County, Kansas, by the Petroleum Administration for War, effective July 27.

Spacing Announced for North Watchorn Pool

CHICAGO. — Locations in the northwest or southeast quarters of a quarter-quarter section are the specified optional spacing pattern for wells deeper than 3,000 ft., in the North Watchorn pool, Pawnee County, Oklahoma, effective July 23, according to the Petroleum Administration for War.

Ickes Admits He'd Make "Good Oil Czar"

WASHINGTON.—The future of Secretary of the Interior Harold L. Ickes remains a topic of speculation in Washington, and he did nothing to quiet it at his press conference last week.

Asked if he intends to follow the lead of former Secretary of the Treasury Morgenthau, he said "I follow my own leads".

Asked what these were, he replied "I haven't decided".

In reply to another question he said he didn't know whether or not he is going to London to negotiate the oil treaty. He was then asked if this means he doesn't know whether or not he wants to go, and he replied that that might be a fair way of putting it.

Another question was whether he had received an offer to be "Czar" of the oil industry, and the secretary replied:

"That's news to me—but I'd be a good one".

Reports are that Ickes has presented President Truman with a long list of important matters he has pending as an argument why he should retain his seat in the Cabinet for several years more, but it is recalled that Secretary Morgenthau presented similar reason why he should be retained at least until the end of the war with Japan but failed to obtain assurance that he would be kept.

XUM

Petroleum Enters Into Production Of Almost All Modern Articles

NEW YORK. — Petroleum, indispensable to victory in war, also enters into the production of almost all articles of modern living, says a report of the American Chemical Society, outlining the scope of "petroleum's virtually unlimited utility as a processing material," called a little known phase of the oil business.

Petroleum is utilized not only in food, shelter, and clothing, but it even increases the yield of potatoes, and helps chickens lay more eggs, while new special oils are being used for better mosquito control, and to inspect raw quartz for radar and radio equipment.

Millions of barrels are used annually by more than 30 basic industries in manufacturing, and in thousands of individual applications, apart from petroleum's familiar roles as fuel, lubricant, and raw material for hundreds of pure synthetic chemicals, including butadiene and styrene for synthetic rubber, and toluene for TNT.

Clothes to Furniture

"If one looks about, he will be able to find very few articles which do not utilize a petroleum products somewhere in manufacture," says Dr. John C. Dean of the technical division, process products, Socony-Vacuum Oil Co., Inc., Paulsboro, N. J., in "Chemical and Engineering News".

"The clothes and shoes one wears, the furniture one sits on, the paper one sees, and a host of other everyday articles either contain petroleum, or used it while being made."

One of these important products is paraffin wax, of which more than 700,000,000 lb. are produced each year in this country alone. About 80 per cent of this water-resistant wax is used on paper and paper products, including bread wrappers, paper milk bottles and drinking cups and straws, butter cartons, and cracker boxes.

Paraffin wax also is used in paper bomb rings for 500 and 1,000-lb. bombs, and in making fuel tablets for front-line troops to heat coffee and soup.

It "is even employed as a window paning for chicken coops. Since it transmits more ultraviolet light than does glass, the chickens in the coop will lay more and better eggs."

From petrolatum—itself used in vaseline, butchers' wrapping paper, cosmetics, carbon paper, and as a waterproofing material for canvas and rock wool—come the very valuable microcrystalline waxes.

These materials, resembling beeswax, are used in coating and impregnating electrical parts, and have great utility as waterproofing paper coatings, especially when blended with paraffin wax. Their production has been expanded enormously for wartime packaging of countless metal articles, precision instruments, foodstuffs, field rations, and small arms ammunition.

Microcrystalline waxes are employed in packing dehydrated and frozen foods, in making laminated papers, in lining metal containers to protect the metal against the corrosive action of the contents, in high-grade inks to prevent "skinning," and are ingredients of carbon paper, rubber, crayons and a host of wax compositions.

Wax emulsions — suspensions of wax in water stabilized with suitable emulsifiers and dispersing agents—are another important class of petroleum processing products.

"A wax emulsion is now being used for the treatment of white potatoes to improve storing properties," Dr. Dean continues.

Great quantities of wax emulsions are used in processing woolens and worsteds, in finishing or sizing of cotton goods, and as lubricants for rayon fibers.

Textile and Wood Products

Other uses of wax emulsions include treating textiles to impart water-resistance, in making water-resistant paper, and in manufacture of certain wooden articles such as bowling pins and shoe lasts.

Among uncompounded synthetic oils is one used "for the inspection of raw quartz which is to be cut into quartz oscillators that control wave length in radar and radio equipment. These oscillators can be made only from sections of raw quartz crystals which have no internal imperfections, and in addition must be cut at very definite angles with respect to both optical and electrical axes of the crystals.

"The crystals must therefore be inspected, but since most raw quartz is scarred and has many opaque surfaces, careful study of the interior is often impossible. However, this can usually be accomplished by immersing the quartz in a liquid having the same refractive index, upon which the crystal boundary becomes invisible. Since light is not bent in passing through the liquid-solid interface, surface flaws no longer obscure the internal defects.

"Since inspection cannot be accomplished with conventional petroleum oils because of their low refractive index, this operation was originally accomplished with chemicals which are highly odoriferous, and somewhat irritating to human skin. Later a petroleum product was developed in which these undesirable properties were reduced appreciably without loss of efficiency of inspection."

Another synthetic oil is being used for mosquito control.

"Quite recently, studies have been made of mosquito control with a light-bodied synthetic oil which is heavier than water. This product, which is applied in emulsion form, has been used successfully for controlling pest mosquitoes of the culex and culicini families.

"The use of an emulsion of this high specific gravity oil overcomes the drawbacks of surface oils, because wind will not blow it from the surface nor will it evaporate. Treatment of infested areas with the synthetic product need be made only a few times a season instead of every 10 days."

Medicine and Cosmetics

Highly refined oils from petroleum have been used for years for medicinal purposes, and also in cosmetics, hair oils, ointments and even animal feeds. Others are employed as ovicides in tree sprays, as impregnants for wrapping papers and fruit wraps, and in preservation of eggs.

Numerous materials from petroleum byproducts have important uses in war and peace, among them naphthenic acids, petroleum resins, and petroleum sulfonates, he explains.

"Soda soaps of certain naphthenic acids are used today in special death-dealing articles of warfare which cannot be described for military reasons.

"Lead, manganese, and cobalt soaps are excellent paint driers because they catalyze the setting of paint and varnish films. In addition, copper soaps of naphthenic acids are extremely useful as fungicides and insecticides."

Petroleum resins, extracted from gasoline to reduce gum-forming tendencies, are used as extenders for paint-and-varnish making oils, are applied to metals as protective coatings, and serve as binders for sand in preparing foundry cores for casting metals.

Mineral oil sulfonates are used as a wetting agent in dyeing textiles, as ingredients in special hard-water and salt-water-resistant soaps for the armed forces, for making self-emulsifiable oils, such as cutting oils, and also many of the newer type rust preventives.

THIS WEEK

RESEARCH—Large-scale production of important chemicals from natural gas announced. . . . Formerly made from petroleum. . . . ¶New process of extracting oil from shale reduces cost, but still can't compete with wells. . . . Each ton of shale yields 17 to 40 gal. of oil. . . . ¶"Immensely valuable" data on Germany's production of synthetic gasoline and oil seized by Allies. . . . ¶New lube, synthetic organic chemical, contains no petroleum. . . . Promises easy winter starting. . . . Doesn't decompose under heat. . . .

ADMINISTRATION— FPC isn't trying to extend its control over oil and gas, Chairman Manly says. . . . Has "enough headaches already." . . . ¶Preservation of oil reserves demands cooperation of government and industry, O'Mahoney asserts. . . . When war ends, have to find "another huge market." . . . ¶Louisiana advertises will lease land 30 miles out in Gulf. . . . Old 3-mile limit based on ancient distance of cannon shot. . . . Many cannon now shoot 27 miles. . . . Lively controversy in sight. . . . ¶Another natural-gas inquiry proposed in Senate. . . . Vast network of pipe lines "without proper coordination" with other forms of transportation. . . . ¶"Shipsale bill," reported out of House committee, sets postwar policy for tanker disposal. . . . May fix pattern for all government war plants. . . .

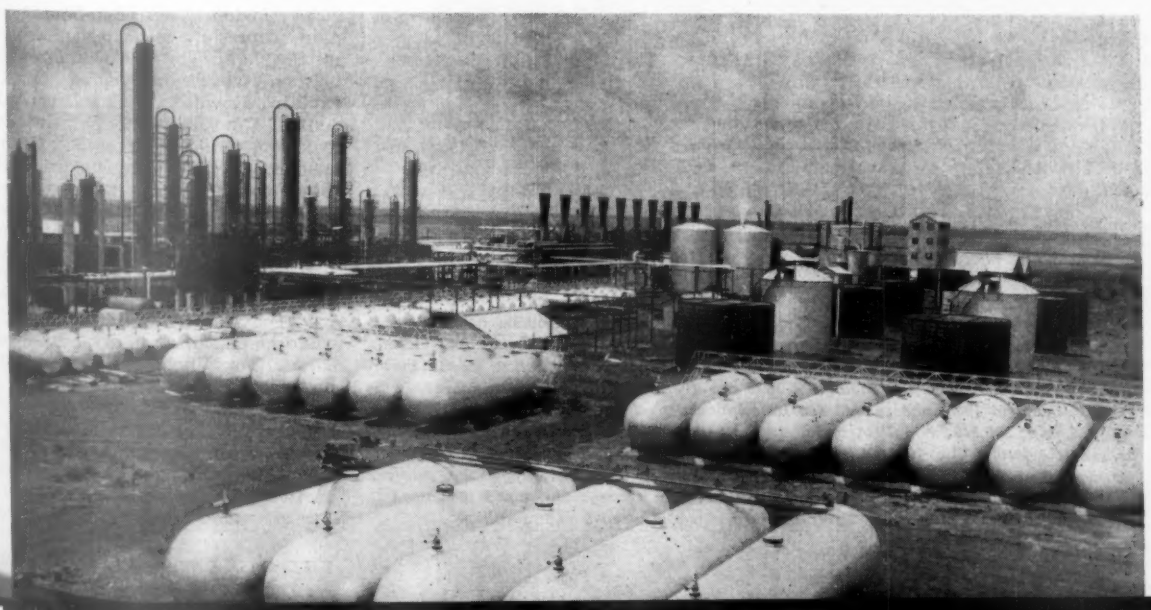
ECONOMICS—Raising state gasoline taxes a boomerang, warns chairman tax evasion committee. . . . Higher taxes mean diminishing returns. . . . ¶OPA and OES clear decks for swifter handling of reconversion pricing problems. . . . Set up procedure for removing many controls. . . . ¶Steps taken to prevent excessive charges for surplus war goods. . . . Resellers provided with simpler method of figuring ceiling prices. . . . ¶FEA establishes general licenses covering exports to Middle East. . . . ¶WPB says industry making excellent progress toward reconversion. . . .

PRODUCTION— Nation's output drops from all-time high of 4,939,600 bbl. daily to 4,928,200. . . . Minor losses recorded by California, Illinois, Kansas. . . . ¶New weekly completion record of 596. . . . Beats by 5 the previous high scored in week ended July 14. . . . ¶Millionth barrel of crude for 1945 produced July 28. . . . That milestone reached last year August 12. . . . ¶Price increases granted by OPA in 21 pools, in 8 states. . . .

FOREIGN— Ecuador and Peru settle 3-year boundary dispute. . . . Petroleum resources involved. . . . ¶Arabian American to build pipe line from Saudi Arabia to Mediterranean. . . . Avoid tanker transportation and Suez Canal tolls. . . . ¶France, previously reported opposed to plan of American oil companies to build refineries near Tripoli, expresses satisfaction. . . . Has mandate over Levant states. . . . ¶Almost half oil wells on Tarakan Island can be operated immediately. . . . Full production within a year. . . . ¶Largest sale reported by Persian Gulf Command field commissioner to Army-Navy Liquidation Commission was to Arabian American. . . . Engineering equipment for its high-octane refinery. . . . Totaled $171,219. . . .

TRANSPORTATION— Texas Empire, backed by presidential proclamation, authorized to build oil line through three Illinois counties. . . . Landowners, tenants had blocked project. . . . Necessary for national defense. . . . ¶ODT authorizes tank-car hauls within 80-mile radius in 42 states. . . . Former limit 200 miles. . . . Eases holiday Sunday, 24-hour loading requirements. . . .

View of the Celanese Corp. of America's chemical plant at Chemcel, near Bishop, Tex., first large-scale operation of its type using natural gas as raw charging stock. In the foreground are large octane and propane storage tanks and in the background are fractionating towers used in the processes by which the various chemicals are made. *(See story, page 117)*



Co-ops' Competitive Advantages Eyed by Tax-Burdened Industry

by T. F. Smiley

DOES the cooperative system possess unfair competitive advantages over privately owned oil business? Does it threaten oil operations conducted on a profit basis with virtual extinction?

Right there you hop into a caldron of sizzling-hot debate.

An earlier article (July 21, 1945) told how petroleum cooperatives had grown from an inconspicuous service station at Cottonwood, Minn., in 1921 to a far-reaching system embracing oil wells, refineries, pipe lines, and distribution setups, with annual oil sales already approximating $60,000,000 and steadily mounting.

But the cooperatives contend they operate on a nonprofit basis. They assert it would be unfair to require the cooperative corporation to pay federal income tax on earnings when the recipients of so-called "patronage dividends" must pay federal income tax on these dividends. A friendly administration in Washington seems to have taken the same view.

Tax-laden oil companies say this misses the point. The law requires that the earnings of an oil company be taxed while they are in the hands of the corporation and taxed again when they are distributed as dividends to shareholders. Whether the law is fair or unfair, it should apply to the cooperative corporation as well as to any other kind.

Among needed relief measures indicated by voluntary opinions of 10,000 executives of small business, as disclosed by a recent survey conducted by the National Conference of State University Schools of Business, was this:

"Income-tax laws changed to remove double taxation of corporation dividends and to allow building up reserves, and 'an even break' through equal taxation of cooperatives and private business."

National Tax Equality Association grimly declares:

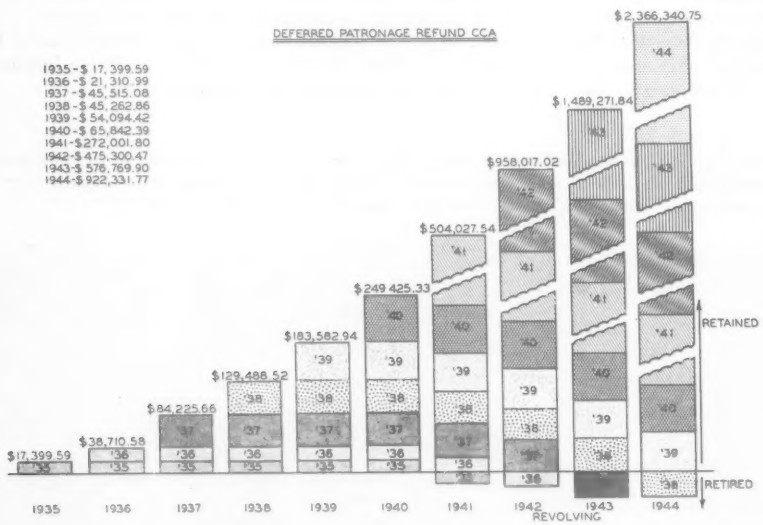
"These days of high corporation taxes and war prosperity in business constitute a heyday period for cooperatives to pyramid their capital and absorb their private business competitors. . . . Cooperative business and government - in - business have demanded and won privileges under tax and other laws that give them tremendous trade advantages. . . . If the cooperative or governmental way of doing business should succeed in monopolizing the field, and all 'profits' became 'savings,' who would then pay the taxes now supplied by business? . . . The issue is not simply whether a few individual businesses will be saved from unfair competition, but whether the present free-enterprise system is to be replaced by an outright socialistic economy."

"Shadowboxing," the cooperatives sniff indignantly.

"There is not now and has never been any wholesale escape of income from tax liability through the operation of farmer cooperatives," asserts R. Wayne Newton, manager National Association of Cooperatives. . . . "The real issue is not whether savings realized by the farmer through his co-op should be taxed. It is only where the tax should be imposed — at the co-op level or at the farm level. . . . The cooperative acts as agent for its farmer member in performing buying and selling operations for him. As agent the co-op can have no claim to money which passes through its hands. That money is not income to the cooperative, so it has nothing on which an income tax can be levied."

"Funds in the hands of a cooperative at the end of the year, after all costs of doing business have been paid, represent overcharges which, in the hands of individual enterprisers, would be called profit." explains Howard A. Cowden, president of Consumers Cooperative Association, which did a $12,254,000 business in oil products in 1944. "Since consumers organized to serve themselves cannot make profit out of themselves, they treat overcharges for what they are and return them to those who were overcharged in the first instance. To ask a cooperative to pay income tax on such funds would be as fair as to ask a business man without income to pay an income tax."

In rebuttal, critics of the cooperative system say there is no difference between the so-called "savings" dollar of the cooperatives and the "profit" dollar of private enterprise. Both are made by the same processs



Under its 5-year revolving-fund plan Consumers Cooperative Association pays out each year to its member associations, not the "patronage savings" of the year just closed, but those of the twelvemonth ended 5 years before. (Cooperatives refuse to call these savings "profits.") Thus, the savings of 1939 are distributed in 1945; those of 1940 will be distributed in 1946, and so on. The association's reserve fund grew from $17,399.59 in 1935 to $2,366,340.75 in 1944 under the operation of this revolving plan. The fund began to "revolve" in 1941. Checks payable to member associations that year—the savings of 1935—totaled $17,065. In 1944 these checks totaled $43,753. The reserve fund promises to rocket, for each year's additions to it are many times the amount of the disbursements, based on the savings effected 5 years earlier

of buying and selling. Both are the property of the owners of the business, who in the case of a private enterprise are investors and in the case of a cooperative are patrons. So, it is argued, if the one is subject to federal tax, the other should be, too.

Then too, the so-called patronage dividend returned to patrons at the end of the year is not always in cash. Sometimes it is in the form of stock or other evidence of equity, issued against the cooperative. Thus, it is contended, instead of paying income tax and passing on the remainder of their earnings to members in cash dividends, the cooperatives are able to pocket their profits and use them to expand operations.

Suggestions that privately owned oil businesses may be crowded out of the field are characterized as fantastic by most cooperators, who add that any shrinkage in the flow of taxes from this source is more than compensated for by the increased buying power of members of co-op associations.

Usual Practices Reversed

Moreover, some insist that the success of the cooperative system is not to be attributed to its light tax load, but to its reversal of the usual practice in establishing a business. Ordinarily, it is pointed out, the private operator arranges for his supply of a commodity first and then, through expensive advertising and salesmanship, builds demand. The cooperative starts at the other end. It establishes demand first, and then provides the supply to meet it.

There are those in close touch with the progress of the cooperative system who aver that there is no intention of extending its activities beyond the farmer. The rural field is already pretty well covered, they say, and any further expansion will be directed toward putting the benefits of the cooperative within reach of the relatively few farm regions not yet covered.

But here we have the Cooperative League proclaiming, "We must invade the cities."

James G. Patton, president of National Farmers Union, says: "The Union hopes to spread its marketing operations until goods flow direct from farm to city consumer co-ops, completely eliminating intermediate charges and profits."

And no one can shut his eyes to the implications of such pronouncements as these by Dr. James P. Warbasse, president emeritus of Cooperative League of the United States: "The oil business in the United States is destined to be taken over by the Government, or it is destined to be run by the cooperatives. . . . You are the people who are taking the only step that makes it possible to put the petroleum business in the private possession of the people. . . . The cooperative movement is tending toward a cooperative democracy as a substitute for the political state."

Though advantages accorded cooperatives by a friendly federal administration have long been recognized, it was not until the war imposed a staggering load of taxes that these advantages began to constitute a real threat to competing businesses. Private oil companies say they are carrying not only their share of the tax burden, but that of the cooperatives too. The inequities of the situation are such that the oil companies, declaring the difference between their "profit" dollar and the cooperatives' "savings" dollar is mythical, demand that as a matter of common justice their earnings and those of the competing cooperatives be placed on the same level of taxability. It is agreed that remedial action must come from Congress.

Marine Gas Turbine Unveiled for Writers

JEANNETTE, Pa.—Handling huge quantities of red-hot air through high-speed compressors and turbines to develop 2,500 hp. of useful energy, the first gas turbine for ship propulsion ever built was successfully put through its paces here last week, at the plant of the Elliott Co., before a group of editors of the country's leading technical journals.

Two years in building, the new power unit, which is a joint undertaking of Elliott research engineers and the U. S. Navy, Bureau of Ships, brings to a conclusion centuries of experimentation with hot air engines and adds a fourth to the three prime movers, steam engines, steam turbines and internal combustion engines, already in existence.

First gas turbine plants to be built for regular service will be installed in sea-going vessels. These additional plants are being designed for increased horsepower output and increased efficiency which will be attained by operating at higher temperatures. The new units are expected to be more compact, lighter in weight, and with turbine and compressor sections so arranged as to fit snugly into ship structures.

"Operating temperatures of 1,400° F. can be used and a thermal efficiency of 32 to 34 per cent is fairly certain," says Ronald B. Smith, engineering vice president of Elliott Co. "With secondary surface type heat exchangers placed athwartships," he adds, "the plant can be installed in a space 16 by 12 by 12 ft., corresponding to less than a cubic foot per horsepower. The total machinery weight will be less than 20 lb. per horsepower."

Two, at least, of the new gas turbine plants will be completed in the next 9 months, according to William A. Elliott, executive vice president.

Other uses now being developed for the gas turbine include their application to generating of electric power and to driving railroad locomotives. The latter, in particular, will be definitely established within the next 2 years, in the opinion of Smith. "Locomotive-type gas turbines," he points out, "will be well adapted to the burning of low-grade fuels. The lower cost of these fuels will undoubtedly result in operating expenses less than present diesel locomotives and materially better than present coal-burning reciprocating locomotives."

Eight Texas Plants to Be Completed This Year

HOUSTON.—Eight gasoline plants and one cycling plant, authorized by Petroleum Administration for War, are under construction in Texas, and all are scheduled for completion this year, according to J. H. Graham, director of the natural-gas and natural-gasoline division in District 3. The gasoline plants, with the field and the daily liquid capacity, in gallons, of each, follow:

Arkansas Fuel Oil Co., Carthage, 27,000; Chicago Corp., Carthage, 140,000; Glen McCarthy, Stowell, 70,000; Southern Minerals Corp., Agua Dulce, 24,000; United Gas Pipe Line Co., Carthage, 125,000; Phillips Petroleum Co., Fullerton, 50,000; Phillips Petroleum Co., Hugoton, 45,000; Schwartz et al, Quitman, 11,000.

The cycling plant, of 28,000 gal. daily capacity, is being built in the West Tuleta field by Gasoline Products Corp.

Hanks Succeeds Robinson On Nominating Committee

OIL CITY, Pa.—George J. Hanks, of Bradford, Pa., president of South Penn Oil Co., has been named a member of the nominating committee of Pennsylvania Grade Crude Oil Association. Hanks, also a member of the association's steering and coordinating committee, succeeds the late Noel Robinson, of Pittsburgh, on the nominating committee.

PAW Bans Asphalt Shipments From District 5

WASHINGTON. — Petroleum Administration for War has prohibited shipment of asphalt from District 5 (West Coast) to other districts, by amendment to Petroleum Administrative Order 23, which also prohibits shipments of residual fuel oil east from the district.

FPC Is Not Trying to Extend Its Controls, Manly Asserts

WASHINGTON. — Federal Power Commission is not trying to extend its authority to include natural-gas production, crude-oil production, or petroleum pipe lines, according to a letter written by Basil Manly, chairman of the commission, to William R. Boyd, Jr., chairman of Petroleum Industry War Council. Neither does the commission desire to invade what are properly regarded as the functions of conservation authorities in the states.

Boyd previously had expressed concern regarding the commission's plans with reference to the forthcoming series of meetings in various areas of the country to study certain aspects of the natural-gas industry.

"We have enough headaches already in dealing with the difficult but highly important problems related to the interstate transportation and sale of natural gas," Manly says in his letter in which he outlines the course to be pursued by FPC in the scheduled hearings.

The letter confirms similar assurances given verbally by FPC when Commissioners Manly, Draper and Olds appeared before PIWC, the agency created by Petroleum Administrator for War to advise the Government on wartime petroleum problems. Chairman Manly writes:

"While the outline of the natural gas investigation necessarily covers a number of topics which are obviously matters of state or local concern, such information is being sought in order to provide a complete and correct picture of the entire industry and not as a basis for asserting or seeking any measure of regulatory authority over such matters on the part of the Federal Power Commission."

No "Invasion" Intentions

Manly quotes as follows from a letter which he had written last December to Gov. Andrew F. Schoeppel, chairman of Interstate Oil Compact Commission:

"We wish to assure the representatives of all the gas-producing states that the Federal Power Commission has no desire to extend its jurisdiction to cover the production of natural gas or otherwise invade what are properly regarded as the functions of the conservation authorities of the several states."

At the time that letter was written, Manly continued, "it was believed that this declaration should be sufficient to completely reassure those who had expressed some apprehension that the commission might be seeking to extend its jurisdiction over the production of natural gas or in some other manner interfere with the several states in the exercise of their respective authorities with regard to natural gas.

"It now appears, however, that similar fears have been expressed that the commission might be seeking to extend its jurisdiction to the production of oil or to establish some degree of regulatory authority with respect to petroleum pipe lines.

"It seems desirable, therefore, to declare in unequivocal language that the commission has no desire or intent to extend its jurisdiction as regards either oil production or petroleum pipe lines. In addition to other good reasons, we have enough headaches already in dealing with the difficult but highly important problems related to the interstate transportation and sale of natural gas."

This statement, Manly says, should cover the questions raised by Judge J. C. Hunter, president of Mid-Continent Oil and Gas Association; Ralph T. Zook, president, Independent Petroleum Association of America; George A. Hill, Jr., president, Houston Oil Co. of Texas; A. Jacobsen, chairman, National Oil Policy Committee, PIWC, and perhaps some others.

"The commission in its conduct of the natural gas investigation has no axes to grind or preconceived ends to serve," Manly declared. "We are seeking the facts regarding matters of vital importance to the entire nation and are glad that the petroleum industry, as represented in the PIWC, is arranging through appropriate committees to present such evidence and views as it considers of importance to the investigation."

Indiana Standard Organizes New Chemical Products Department

CHICAGO. — Recognizing the increasing importance of manufacture of chemical products from petroleum, Standard Oil Co. (Indiana) is organizing a chemical-products department, according to A. W. Peake, president.

The immediate duties of the department will be to explore the market for petroleum chemicals, work with research and manufacturing departments in developing and producing marketable derivatives, and manage sales and distribution.

The new department will operate under general direction of Bruce K. Brown, vice president in charge of development, with William B. Plummer as manager. Plummer was formerly manager of Standard's development and patent department and during the war, until recently, a lieutenant colonel in the Air Technical Service Command, A.A.F. Howard R. Peterson, an experienced member of Standard's sales technical service will be in charge of sales department. Other staff members are being selected.

The use of new synthetic and catalytic processes for manufacturing petroleum products has reached a degree of importance overshadowing that of older methods of refining, Plummer pointed out in a statement in connection with the announcement. These processes are making new chemical byproducts available and paving the way for still further developments in the petroleum chemical field.

Market Among Manufacturers

Many common chemicals such as formaldehyde, methanol (wood alcohol, but not made from wood), and acetic acid can be made from petroleum sources, the Standard statement explains. The market for these and other less-known petroleum chemicals is ordinarily among manufacturers of basic materials or consumer products rather than directly to consumers. For example, petroleum chemicals are used as softeners or plasticizers for rubber compounds and for many synthetic resins and plastics in coating materials and molded products, emulsifiers for various materials and uses, substitutes for linseed and other natural oils used in paints, components for potent new insecticides, and in making synthetic household and industrial washing compounds.

Further details of Standard's program for manufacture of new chemical products and development of new uses for products already available will be announced as these developments become commercial.

FOUNDED IN 1910

BY PATRICK C. BOYLE

The OIL AND GAS JOURNAL

Research Proves Worth

HIGH commendation must be accorded Congress for its recent efforts to create a permanent national policy fostering basic research, scientific development and technical progress. It is difficult to understand the continued apathy of some in high military and civil positions who underrated the importance of research and technology.

But there is danger that legislative enthusiasm may replace sound judgment. Government support could be exceedingly helpful if applied as constructive encouragement. It could be harmful if organized along lines of state socialism and made to work solely for central authority. Scientific progress of no other nation surpasses what petroleum chemists have done in developing aviation gasoline, synthetic rubber, aromatic hydrocarbons, and scores of other derivatives of crude oil.

Superficial examination of the German war machine was enough to prove indubitably that its strength was drawn chiefly from intensive developments in science.

The few United States technicians privileged to make first-hand inspection of the Nazi military inner workings have been highly impressed. They no longer wonder that the Wermacht nearly wrecked the world before productive might of the democracies could be applied in counterattack. German scientists and technicians had applied all their energy, thought and development effort to military instruments for 10 years and longer.

No brief is offered for the Nazi method of harnessing its scientists. There is every reason to believe that the developments would have been even more devastating under a system of free enterprise. The obvious lesson is that research and scientific development can come nearer accomplishing the impossible than any other known forces.

Fortunately, these forces have proven as efficient in developing machines of peace as for building destructive implements of war.

Disclosures from inspection of German preparations for the war can be no more heartening to any group than to the trade press. Industrial papers throughout the country, including the Journal, published hundreds of editorials and analytical reports on the vital place technicians had in building and supporting a war economy. It matters little now that these voices were heard only faintly. It is gratifying that they curbed ever so slightly the drawoff of scientists and technicians by selective service and by war industries which were incapable of using research personnel at their highest skill.

Warning after warning was sounded. It was learned early in the war that British industry was zealously husbanding its scientific personnel. Unstinting encouragement was given by military and civilian authorities. In the closing phases of the European war, occupation of German territory revealed that the Nazi regime accepted a similar policy. Its military leaders dared not molest research scientists in their work for they were the last desperate hope for a miraculous discovery which might stem the Allies.

It is a travesty on logic that American scientific talent often was misapplied. The productive genius would have been even greater if industry had been permitted to blend more science with its skill.

INTERNATIONAL

Arabian American to Build Line to Mediterranean

WASHINGTON.—News has reached here that Arabian American Oil Co., owned by The Texas Co. and Standard Oil Co. of California, has completed plans for a pipe line along the Persian Gulf region from its fields in Saudi Arabia to the Mediterranean. Seven routes for the line were surveyed late last year. Two would terminate at Tripoli or Beyrouth, capital of Lebanon. The other possible terminals are Haifa, Jaffa, El Arish, Port Said and Alexandria. Inquiries are said to have been made by the United States regarding free port rights in Tripoli and Beyrouth.

It is believed Arabian-American Oil will build a 24-in. or 26-in. line to pump Saudi Arabian oil to the Mediterranean, thus avoiding tanker transportation and Suez Canal tolls.

Originally Standard of California and The Texas Co. had hoped to get a United States Government loan to facilitate the financing of this project but it is understood that no loan has been granted and that Arabian-American, which has already invested about $100,000,000 in the Saudi Arabian project, is going ahead with its own funds.

Some sources estimate that the Arabian-American investment in the Saudi Arabian project will total $1,000,000,000 within 10 years.

France has expressed interest in the project in view of the fact that the mandate over the Levant states has been given to her.

Aruba Refinery Increases Output of Many Products

The Lago Oil & Transport Co. refinery in Aruba, which on March 15 completed the processing of its billionth barrel of crude oil since the beginning of operations in January 1929, continues to be fully employed during the first quarter of 1945.

Principal increases in petroleum shipments of the first quarter of 1945 over that of the first 3 months of 1944 were as follows: Naphthenic acids, 133 per cent; United States Navy diesel oil, 106 per cent; unfinished lubricating oil distillates, 106 per cent; gas oil, 77 per cent; commercial fuels, 64 per cent; motor gasoline, 51 per cent, and lower-grade aviation gasoline, 48 per cent. Principal decreases were in tractor fuel, 94 per cent; marine diesel oil, 87 per cent; kerosene, 55 per cent; United States Navy grade 2 fuel oil, 28 per cent, and 100-octane aviation gasoline, 15 per cent.

During the quarter under review the refinery of a Canadian subsidiary which had been closed December 31, 1942, resumed operations on March 13, 1945, employing about 200 persons. The crude oil processed by this plant is obtained from Puerto La Cruz, in eastern Venezuela, and is known to the trade as heavy Oficina crude. For the present the activities of this plant will be confined to the processing of 8,000 bbl. of crude daily in the production of Latin American gasoline (67-octane) and Navy Grade 2 fuel oil.

Ecuador and Peru Confirm 1942 Boundary Agreement

WASHINGTON.—Cordial exchanges between the presidents of Ecuador and Peru indicate that these two "good neighbor" republics have reached a formal and legal settlement of their 1942 boundary disagreement.

Less than 2 years ago, Peruvian engineers opened a long-planned motor truck highway over the Andes from Lima to Pucalpa, at the head of river-boat navigation on the Ucayali, 500 miles upstream from Iquitos. Thus the resources of the once-isolated Oriente-Montaña have been brought close to a river-auto route joining Atlantic and Pacific.

Petroleum is among the recently found resources of this well-watered jungleland. At the turn of the present century the region had a part in the rubber boom which built Manaos, Brazil, one of the most fantastic boom towns of all time, at the junction of the Negro River with the Amazon.

The agreement, called the Protocol of Peace, Friendship and Boundaries, resolved sections of boundary between the two countries which had been the cause of intermittent border difficulties ever since Ecuador seceded amicably from Colombia in 1830, says National Geographic Society.

Texans Hope to Open New Oil Field for Chile

Hoping to open a new oil field for the Chilean Government, 15 skilled oil workers from this state are on their way to the southern extremity of South America. More than a year of preliminary work has been done, and more than 500 tons of drilling equipment has been shipped from Houston to the biting-cold islands that form Tierra del Fuego.

William L. Morrison, Lubbock, Tex., is in charge of drilling work, which is being done on contract with an agency of the Chilean Government, charged with promotion of production. If oil is discovered, great quantities of equipment will be needed at once, and technicians will be required.

The site is 1,700 miles south of Santiago, near Punta Arena, which claims the distinction of being the southernmost metropolis of the hemisphere. The population is 40,000. The wells will be drilled near the Straits of Magellan, where steamship traffic was heavy before the Panama Canal was opened.

Traffic is still heavy from southern Brazil and Argentina around the tip of the continent to the west coast of South America.

The latest in rotary and cable equipment will be used. Morrison is prepared to drill to a depth of 14,000 ft. although he believes that 10,000 will tell the story.

Preliminary seismograph soundings and surface geological studies have convinced the Chilean Government that oil will be found. There are no producing wells in the country. Most petroleum is shipped from Peruvian fields. Wartime shortages have been such that on several occasions during the past year all taxi service was suspended until tankers arrived.

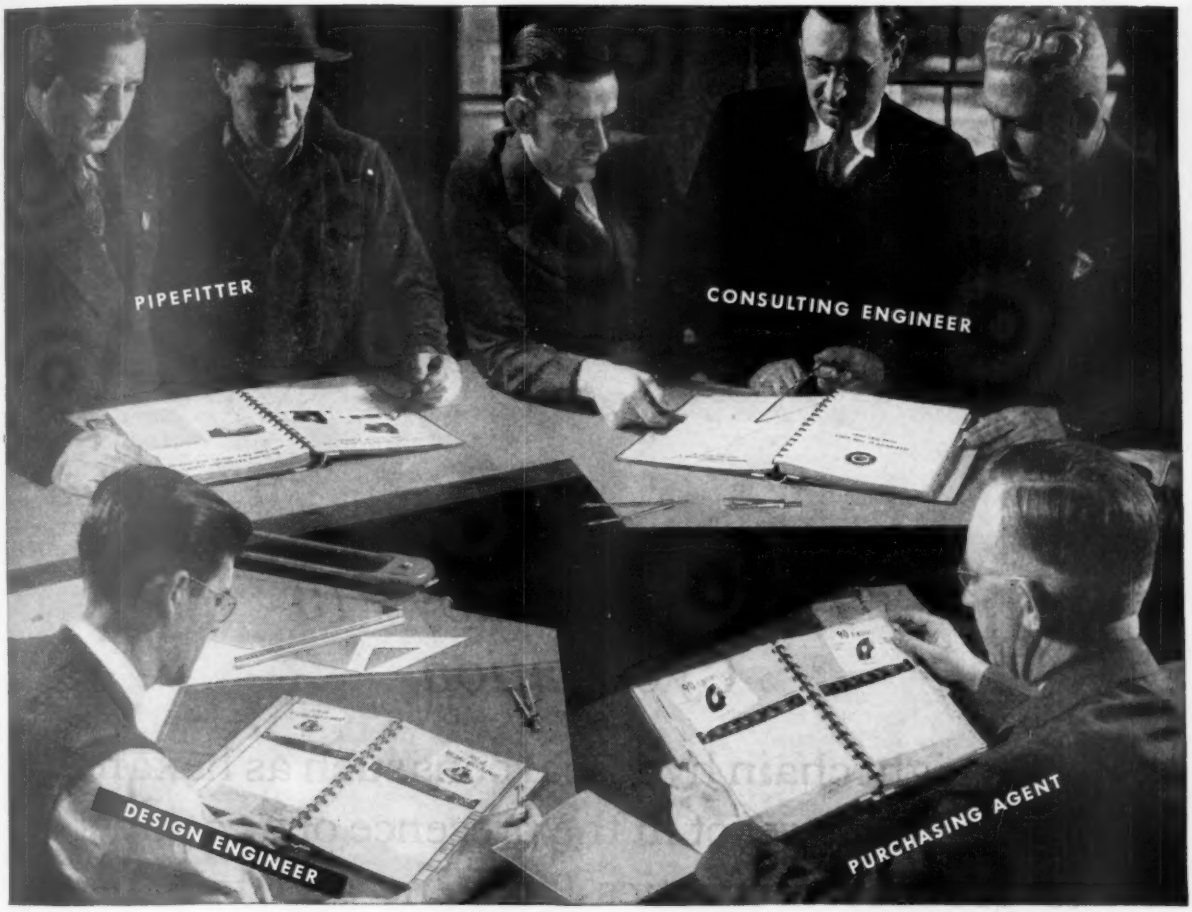
Phillips Venezuelan to Drill Three Travieso Wells

Equipment and supplies are now en route to Venezuela for the drilling of three wells before the year ends on Phillips Venezuelan Oil Co.'s Travieso holdings in the eastern part of that country. Recent developments, Phillips Petroleum Co. reported in its midyear statement, have added special promise to the concern's 26,000-acre Travieso block. The company's midyear statement reported that Phillips Venezuelan exploratory rights now cover 776,000 acres.

Methane-Gas Plants in North Italy Repaired

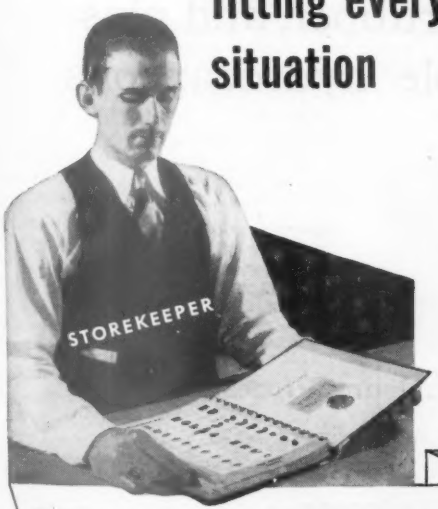
War damage to the methane-gas industry of northern Italy is being repaired, according to reports in the Italian press. Work on two plants which were destroyed and the damaged pipe line between Pietramala and Florence was started in May. Production will be increased by putting into operation the gas wells at Consandolo and Gallore.

XUM



Welding Fittings Information

fitting every situation



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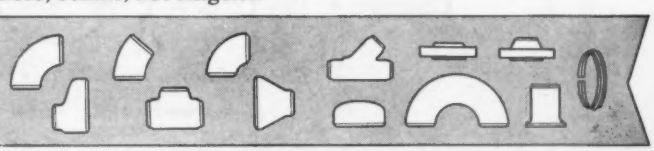
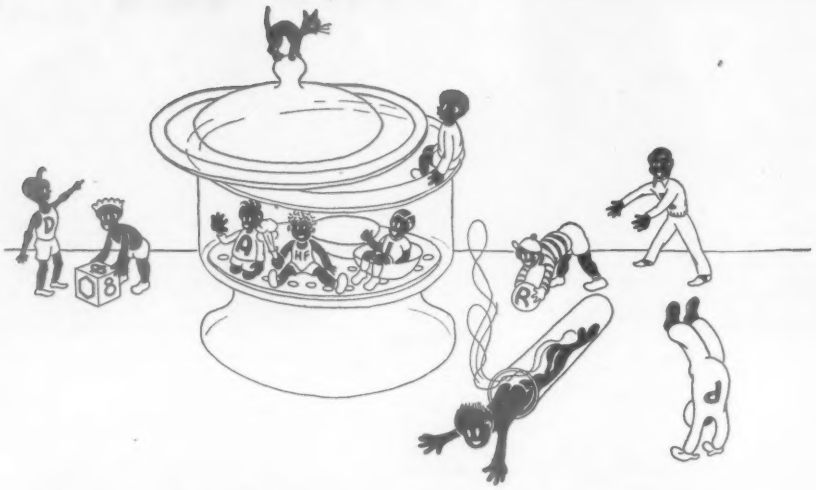
ARMY E NAVY M

TUBE-TURN
TRADE MARK



THE COMPLETE LINE OF WELDING FITTINGS AND FLANGES



Test Tube Baby #10
Cyclization

Straight chain hydrocarbons such as hexane and heptane react in the presence of a catalyst to produce aromatics (benzene and toluene) —an important discovery made in the UOP laboratories. Such compounds are essential for aviation gasolines, TNT, rubber, and plastics. Aromatics are valuable hydrocarbons for war or peace.

CATALYTIC CRACKING	*THERMAL CRACKING*	*RETREATING*
CATALYTIC REFORMING	*THERMAL REFORMING*	*POLYTREATING*
HYDROGENATION	*HYDROFORMING*	*U. O. P. CATALYSTS*
ALKYLATION	*DEHYDROGENATION*	*UNISOL TREATING*
ISOMERIZATION	*POLYMERIZATION*	*U. O. P. INHIBITORS*

Universal Oil Products Co.
Chicago 4, Ill., U. S. A.

UOP

Petroleum Process Pioneers
For All Refiners

The Refiners Institute of Petroleum Technology

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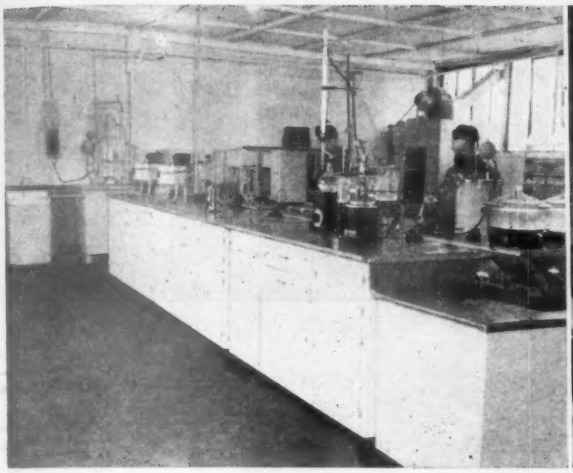
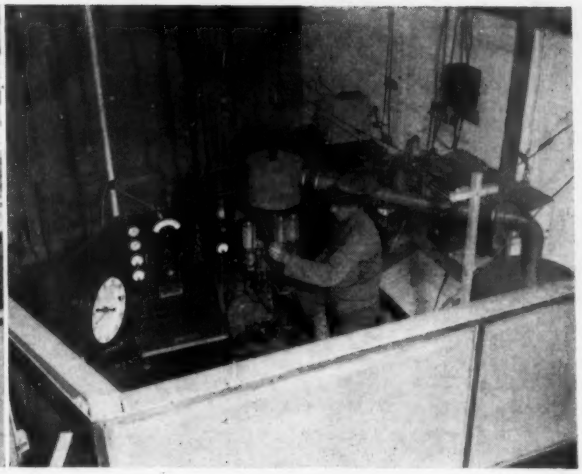




Left: M/Sgt. J. F. German and S/Sgt. N. J. Adams performing tests on A.S.T.M. gum determination and distillation. Other tests run on this unit are steam emulsification number, water by distillation, tag closed-cup flash, Pensky-Marten flash, viscosity, Reid vapor pressure, cloud point, pour point, water tolerance, distillation of water. Right: T/4 S. J. Mayberry, in octane-rating unit

Mobile Oil Laboratory Helped Speed Military Operations

ENGINEERING problems and dearth of facilities, not to mention the booby traps, conspired to keep the task of the 927th Quartermaster Petroleum Products Laboratory from becoming dull during the early days of its service in the Normandy invasion.

It was the job of this unit—a job to be performed without a moment's unnecessary delay—to set up technical equipment; inspect, sample, and test captured German gasoline, diesel fuel, lubricating oil, and greases; inspect storage tanks and prescribe methods of cleaning; inspect pipe-line and header system and prescribe methods of preventing contamination; inspect captured tank cars and prescribe methods of cleaning; set up a program for testing incoming tankers quickly and efficiently; set up inspection and testing facilities for oil products arriving at Cherbourg, stored there, or leaving that city.

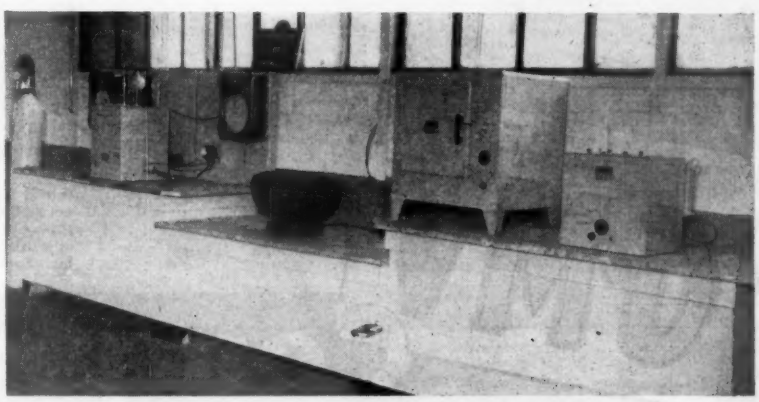
The 927th, commanded by Capt. Howard G. Sholl, a chemist in civilian life, was the first complete mobile and base laboratory to land on the continent during the Normandy invasion. It had been in the first class attending the quartermaster petroleum school conducted by Prof. W. L. Nelson at University of Tulsa. It debarked July 6, 1944, at Utah Beach and proceeded swiftly to its operational center at Cherbourg.

Indicative of the difficulties the outfit faced is the fact that during the first 4 days testing was performed at the grease plant of the Shell bulk depot on rough packing cases. A chemical hood was constructed soon from a grease vat. A balance room, with German plexaglass walls was built. Tables were covered with lead from an acid tank. Kitchen cabinets were commandeered—all former German equipment — resulting eventually in the complete laboratory shown in the accompanying photographs.

Storage facilities were always short and the first big day-and-night job was the disposal of large quantities of German grease, gasoline, lube oils, and diesel fuel. Gasoline was turned over to civilians. Pitch burning oil, used in making the runways of the Querqueville airport, was found to be superior to our liquid asphalt. The lube oils were indispensable in keeping essential civilian industry, such as the turbines, transformers, and engines of light and power plants, in operation. The diesel fuel was used for flushing pipe lines or oiling roads. The greases went to the "Arsenal de Marin."

Large tanks, used by the French and Germans for black fuel, were cleaned by the Army engineers, using high-pressure fire hose. This cleaning alone sufficed to give uncontaminated products and by July 25 the first tanker arrived at Cherbourg.

Inspection of the diesel-fuel tanks, installed in a huge cavern under 150 ft. of solid rock and approached through a 700-yd. tunnel, was conducted among booby traps and mines and without electric lights



Tests run on this unit are: oxygen stability, accelerated gum content, precipitated gum content, worked penetration, corrosion, copper-dish gum, sediment and water, gravity determinations, precipitation number, and foam test

FLEXIBILITY

TYPE GMV ANGLE

Compressors

Two 8-cylinder, 800 hp GMV units installed in Columbian Carbon Company's gathering station at Goldtown, W. Va. Photo at right, showing compressor side, also shows variable clearance pockets. Exterior view at extreme right shows water tower for closed cooling system. Each unit drives its own tower and jacket water pumps.

New York Washington Bradford, Pa. Parkersburg, W. Va. San Francisco, Cal. Seattle, Wash.

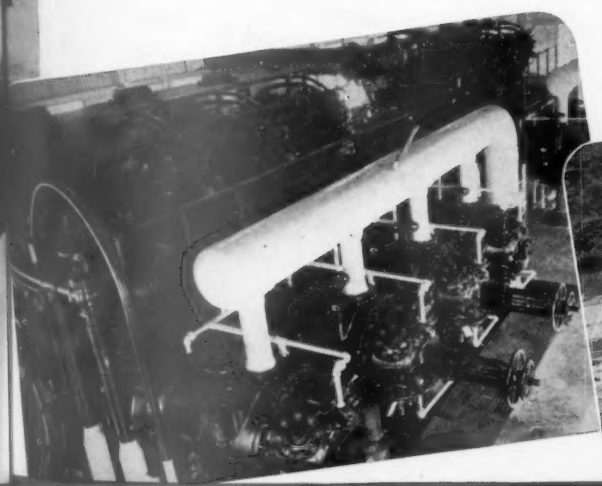
the Keynote at Goldtown

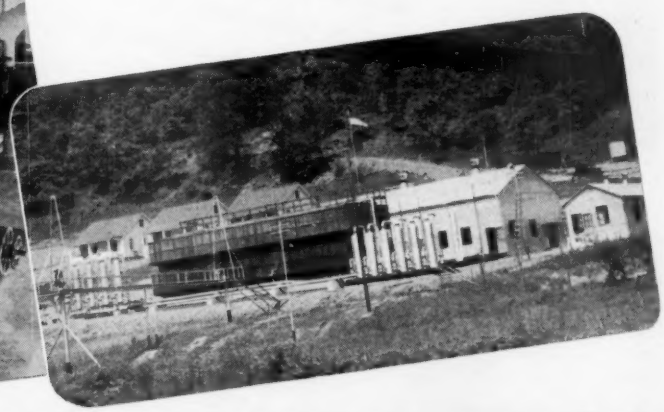
High thermal efficiency, durability, and like qualities are not the only things bearing on the outright economy and effectiveness of compressor installations. Often, an ***extremely flexible set-up*** is essential, requiring units that are wholly adaptable to such requirements.

The photograph at left shows two 800 hp GMV units in Columbian Carbon Company's gathering station at Goldtown, W. Va. — one of five Cooper-Bessemer powered stations delivering natural gas to Carbide & Carbon Chemicals Corporation at S. Charleston for their remarkable production of gas-derived synthetics.

Each 8-cylinder V-type GMV has four crankthrows and each crankthrow drives a double-acting compressor cylinder with built-in by-pass valves and with remote control suction valve lifters to permit single-acting operation. Moreover, two of each unit's cylinders are equipped with variable clearance pockets. Thus both engines may be operated at constant full load under a wide range of field pressures. It is a highly practical, extremely flexible setup.

The ability to power compressor cylinders of many types and sizes . . . to provide the required number of stages per unit . . . and to operate smoothly, with peak efficiency throughout the full normal speed range, makes the versatile GMV especially desirable wherever unusually critical or out-of-the-ordinary conditions prevail.



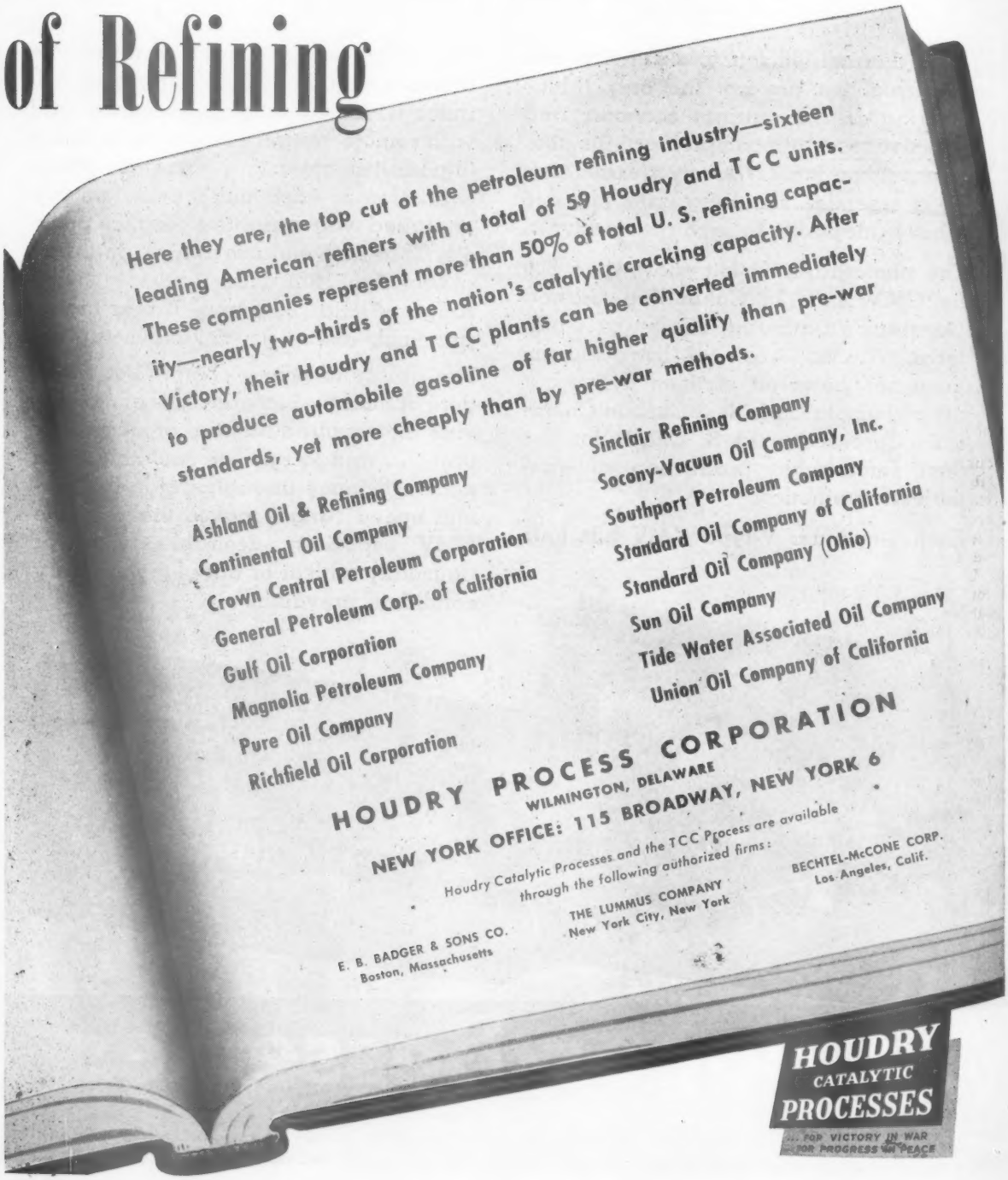


by **Cooper-Bessemer**

MOUNT VERNON, OHIO AND GROVE CITY, PENNA.

Houston, Dallas, Greggton, Pampa and Odessa, Texas Tulsa Shreveport St. Louis Los Angeles

The list of Houdry licensees is the Blue Book of Refining


Here they are, the top cut of the petroleum refining industry—sixteen leading American refiners with a total of 59 Houdry and T C C units. These companies represent more than 50% of total U. S. refining capacity—nearly two-thirds of the nation's catalytic cracking capacity. After Victory, their Houdry and T C C plants can be converted immediately to produce automobile gasoline of far higher quality than pre-war standards, yet more cheaply than by pre-war methods.
Ashland Oil & Refining Company
Continental Oil Company
Crown Central Petroleum Corporation
General Petroleum Corp. of California
Gulf Oil Corporation
Magnolia Petroleum Company
Pure Oil Company
Richfield Oil Corporation
Sinclair Refining Company
Socony-Vacuun Oil Company, Inc.
Southport Petroleum Company
Standard Oil Company of California
Standard Oil Company (Ohio)
Sun Oil Company
Tide Water Associated Oil Company
Union Oil Company of California
HOUDRY PROCESS CORPORATION
WILMINGTON, DELAWARE
NEW YORK OFFICE: 115 BROADWAY, NEW YORK 6
Houdry Catalytic Processes and the T C C Process are available through the following authorized firms:
E. B. BADGER & SONS CO. Boston, Massachusetts
THE LUMMUS COMPANY New York City, New York
BECHTEL-McCONE CORP. Los Angeles, Calif.
HOUDRY CATALYTIC PROCESSES
... FOR VICTORY IN WAR ... FOR PROGRESS IN PEACE

XUM

on the same day that fighting ceased on the Cherbourg peninsula. Tank cars which had contained pitch burning oil were cleaned by long steaming which emulsified the oil on the walls so that it could be scrubbed, brushed, and wiped off. No ordinary solvents could be used to clean the pitch oil (perhaps synthetic) from the cars.

During first use of the ship-to-shore piping system of the Hainneville tank farm which had numerous unknown connections and which was full of bunker fuel, samples were taken night and day at 15-minute intervals at the booster pump house. The slop gasoline was subsequently pumped from station to station as new sections of pipe line were laid behind the front.

A small boat was used to meet tankers in the harbor or channel to obtain samples, and thus permit pumping as soon as the tanker docked. In all, 64 tanker shipments were handled through the laboratory between July 27 and November 28, 1944. Most of the ships carried mixed cargoes and hence complete laboratory tests, rather than gravity and visual inspection, had to be conducted.

Over 500,000,000 gal. of gasoline was received, tested, and reshipped by tank car, pipe lines, drums, jerricans, and tank wagons. Over 5,000 tank cars of gasoline left the port during the operation of the 927th laboratory. The QM laboratories' seal of approval was necessary on every gallon of gasoline or diesel fuel that left the Cherbourg tank farm.

To guard against deterioration or contamination either by accident or sabotage, all gasoline and diesel storage was tested each week. Tank cars present many opportunities for sabotage and each car was approved before filling, tested before shipment, and at decanting points the mobile laboratory unit made two inspections daily, mainly to detect water contamination. En route, the gasoline arriving at the Army's railheads, truckheads, and decanting points is tested by the mobile laboratory unit that serves each Army.

These mobile units, although completely contained in one K-19 trailer, are equipped to run all of the routine tests except octane number.

Captain Sholl's mobile unit followed the Third Army after August 1944, testing stocks left by the Germans, receiving oil supplies, advising with military intelligence in determining the condition of enemy supply, detection of new or improved products by the enemy, and disposing of captured oils.

In all, more than 54 different routine oil tests were conducted regularly by the laboratory and, in addition, it was called upon to conduct many chemical tests such as water analysis, analysis of bearing metals, engine-head deposits, rubber, paint, varnish, and soap products.

Captain Sholl has just completed an inspection of refinery and oil installations throughout France, Belgium, Luxembourg, Germany, Austria, and Czecho-Slovakia.

Oklahoma Allowable Raised 8,000 Bbl. Per Day

OKLAHOMA CITY.—An increase of 8,000 bbl. in the daily crude-oil allowable for Oklahoma fields was authorized here July 31 by the Corporation Commission for August and September operations. The daily allowable for the 2 months was set at 388,000 bbl.

The largest increase in crude oil was authorized for the West Edmond field which is permitted to produce 75,500 bbl. per day in August and was given an allowable of 80,000 bbl. daily in September. The field was permitted 74,000 bbl. per day in July.

OPA Grants Crude-Price Increases in 21 Pools

WASHINGTON.—Ceiling-price increases of 1 to 35 cents a barrel have been granted by Office of Price Administration in 21 oil pools in 8 states. The increases, effective July 1, are under the stripper-well premium payment plan, which provides that first purchasers of stripper oil shall be compensated by the Government for the exact amount of the increases authorized, which is not to be passed on to consumers in the form of higher prices for petroleum products.

The 21 pools, and the amount of each increase in cents per barrel, follow: Arkansas — Urbana (Travis Peak), 15. California—Olinda (Upper B) Brea Olinda, 35. Indiana—Oakland College, 25; Oaktown, 35. Kansas—Beaumont, 25; Toulon, 7; Welch, 12. Michigan—Bangor North, 20; Beaverton West, 20; Hamilton North, 25. New Mexico—Benson, 5; Halfway, 35; Maljamar North, 35. Oklahoma — Burbank, 35; Flesher East, 25; Rea, 35; Searight, 5; Thomas, 1. Texas—Clara Couch, 35; Peters East, 25; Wortham, 15.

Increases previously granted to the Mt. Carmel pool, Indiana, and the Halley pool, Texas, were revoked, because the pool do not qualify.

Share Your Journal With a Service Man

This issue of The Oil and Gas Journal can be mailed to any service man in the United States for 5 cents.

Due to weight restrictions, it cannot be remailed to an APO or Fleet address unless requested by a service man.

DEATHS

John E. Shaffer, 73, retired oil operator, died July 24 in Tulsa.

I. D. Rushing, 39, petroleum engineer, died July 23 in Kilgore, Tex., from a bullet wound suffered accidentally while he was cleaning a rifle.

Harry Witchen, 58, for 21 years a driller for Kendall Refining Co., died July 24 in Bradford, Pa., from injuries suffered 5 days before in a friendly wrestling bout with a friend. Four ribs were fractured in a fall, and a lung was ruptured.

C. Snelling Robinson, 81, for 39 years vice president of Youngstown Sheet & Tube Co., died July 22. He was a graduate of Massachusetts Institute of Technology.

M. N. Phillips, 45, oil engineer, died in Whittier, Calif., July 17. He was a graduate of Stanford University and began his oil career as a roustabout for Standard Oil Co. of California. Later he was petroleum engineer for Marland Oil Co. and was advanced to production engineer when Continental Oil Co. absorbed Marland. In 1938 Phillips was appointed general field superintendent for British-American Oil Co. in the Mid-Continent and later was that company's general superintendent in California.

Frank H. Littlefield, 78, chairman of the board of Canadian Oil Companies, Ltd., died July 25 at Toronto. A native of El Paso, Ill., he was associated originally with National Refining Co., Cleveland. He went to Canada in 1908, organizing its Canadian affiliate, Canadian Oil Companies, Ltd. He was made vice president, then president, and about 6 years ago chairman.

Abe Singer, 50, independent oil producer, with holdings in East Texas and the Osage country, died July 27 in Tulsa.

Edward H. Argue, 72, pioneer Tulsa oil operator, died July 29 at Albert Lea, Minn. His father, Henry H. Argue, was one of the first producers in the Glenn pool.

Clarence L. Wingate, 57, independent oil operator, died July 30 in Wewoka, Okla.

Rustless Pipe for War and Peace

by Frederick Squires*

Introduction

OIL, gas, soil, air, and salt water attack and shorten the life of oil-field steel. Of these enemies, salt water is the most destructive. The use of nonmetallic pipe helps to answer the wartime demand for "more oil with less steel," and since there is no V-Day in the endless fight of rust against steel, whatever helps in war will be helpful when war is over. With this in mind, the Illinois State Geological Survey set up the project of investigating corrosion-proof pipe and couplings, the results of which are described here. An earlier project, along related lines, resulted in the successful running and cementing of fiber-pipe casing in a 500-ft. well, an operation described in The Oil and Gas Journal for May 28, 1942.

Scope of the Investigation

The most satisfactory corrosion-proof pipe-forming materials were found to be of the following compositions: (1) coal-tar pitch with a binder of macerated paper and wood fiber; (2) cement with a binder of asbestos fiber, and (3) both plain and reinforced plastics.

We made pipe which we called "Glascrete," consisting of highly compressed cement with glass-fiber reinforcement which we tested and found incapable of withstanding shock and suddenly applied loads. However this experiment suggested the substitution of plastics, reinforced with glass, for cement. We found that threaded couplings made of cast iron, steel, stainless steel and plastic, either plain or reinforced with glass fiber or metal, could be used on threaded asbestos-cement pipe. This pipe seemed to require couplings of a material more elastic than the pipe itself. Stainless steel and plastic pipe were found to be too expensive for a complete assembly, but couplings of these materials, used to join lengths of fiber or asbestos-cement pipe, were sufficiently economical in view of the small fraction of the entire pipe line occupied by the couplings.

Sections of fiber-asbestos cement and plastic pipe were tested for ability to resist bursting and collapse. Pipe and coupling assemblies were tested for strength to resist parting both in the pipe and at the joint, and leakage at the joint. Non-metallic pipe lines have heretofore been connected by means of a variety of shoved joints, made tight either by friction holds or rubber gaskets. The couplings which, because of the greater strains on them, should be the stronger part of non-metallic pipe lines, have always been the weaker, because advantage has never been taken of the great inherent strength of a threaded connection. A good deal of time was devoted to the problem of threading pipe and couplings with results which seemed to be promising. It was found that threading by grinding with high-speed abrasive wheels overcame many of the difficulties previously thought to be insurmountable. Couplings were made of asbestos cement, cast iron, steel, stainless steel, plain plastic, and glass-fiber and metal-reinforced plastic. Tests were made on the pipe alone and on the pipe and coupling assembled.

*Petroleum engineer, Illinois State Geological Survey, Urbana. Paper furnished with permission of the chief.

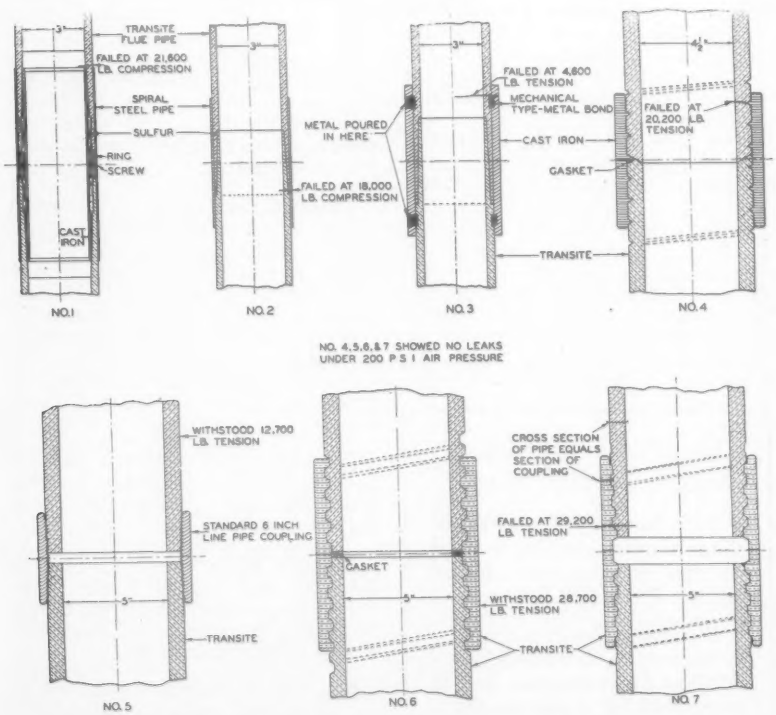


Fig. 1—Seven methods of coupling asbestos cement pipe

Fiber Pipe Tests

The composition of fiber pipe is 75 per cent coal-tar pitch and 25 per cent macerated paper and wood fiber. It is made on mandrels in 5 and 8 ft. lengths. Designed originally for use as electric conduit, it has been successful for this purpose under a wide variety of conditions for many years. The weight of fiber pipe is only 16 per cent of the weight of steel pipe of equal cross-section.

Fiber conduit is made to meet three classifications. The second of these three commercial grades was tested for strength at Halliburton Oil Well Cementing Co.'s Flora plant. The pipe was destroyed by bursting at an average pressure of 220 psi. Collapse occurred at 420 psi. Ultimate tensile strength was 2,500 psi., and ultimate compressive strength 5,000 psi. These degrees of strength prove it is usable for gravity lines and for cemented-in casing for shallow wells.

No leakage tests were made because of the nature of the joint. Pipe supplied us was not threaded but the joint was made by tapering the end of the pipe and driving it into an oppositely tapered coupling. The elasticity of the coupling binds the pipe and provides a friction grip. The ability of such a joint to resist separation varies over a considerable range and is therefore not reliable except for surface gravity lines. Threaded fiber-pipe joints connected by threaded stainless steel or plastic couplings provide a practical corrosionproof string for sur-

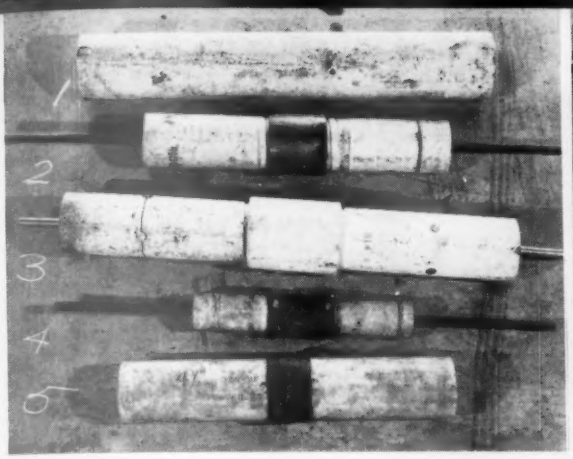


Fig. 2—(Left) A section of asbestos cement pipe at 1, joint 4 at 2, joint 6 at 3, joint 3 at 4, and joint 5 at 5

Fig. 3—(Right) The joints after being tested to failure. Points of failure are indicated for each joint in Fig. 1

face lines and for cemented-in casing for shallow wells. The plastic couplings are stronger than the pipe, and the joint is leakproof.

Tests with dilute acids and alkalis did not affect the fiber pipe, and immersion in crude oil for 8 months produced only a slight tackiness of the exposed surfaces. These corrosion-resisting qualities make it especially useful for salt-water disposal, both for surface lines and for short strings of subsurface casing.

The main difficulty with the pipe of this composition is that severe shocks such as are often experienced in shipment and other handling may produce crazing, which is difficult to detect but which weakens the pipe. It is also subject to the defect of cold bending under its own weight. To correct both these imperfections as well as to increase its strength for every kind of load, the pipe may be cement lined by the same process that is used to protect metal pipe against corrosion. Cement-lined fiber pipe may be further strengthened by first incorporating coiled-wire reinforcement sprung against the inside of the pipe and then cementing it in, the resulting reinforced cement inner sheath providing a great increase in the pipe's resistance to bursting. This makes the pipe suitable for pressure lines on the surface and cemented-in casing for deeper wells.

Asbestos-Cement Pipe

Asbestos-cement pipe is made on mandrels which pick up a coating of cement, water, and asbestos fiber. A roller above the mandrel subjects the coating to high pressure while it is being built up. It is made in several grades, from flue pipe at the bottom of the scale up to pipe that stands 200-lb. pressure.

Commercial lengths are 13 ft. Couplings are made in a variety of ways but none are threaded so that when used in any but a horizontal position the line must be supported to keep it from pulling apart. The usual uses are for electric conduits, vent pipes, and water mains. It has been used as a well casing with screwed joints in only one installation. Brundred Oil Co. has used this pipe with perforated beveled telescoping joints for liners for the bottom hundred feet of oil wells in Pennsylvania.

Tests of Joints for Asbestos-Cement Pipe

Seven kinds of experimental joints for asbestos-cement pipe were

Fig. 4—Joints 1 and 2 (shown also in scale sections on Fig. 1) and a section of similar asbestos cement pipe for comparison. No tension test was made, but compression tests destroyed joint 1 (center) at 21,000 lb. and joint 2 (right) at 18,000 lb. The pipe (left) failed in compression at 25,200 lb., showing that the joints weakened the pipe

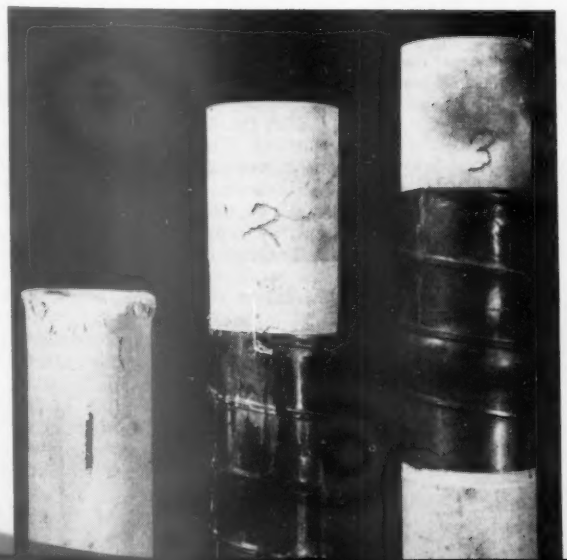
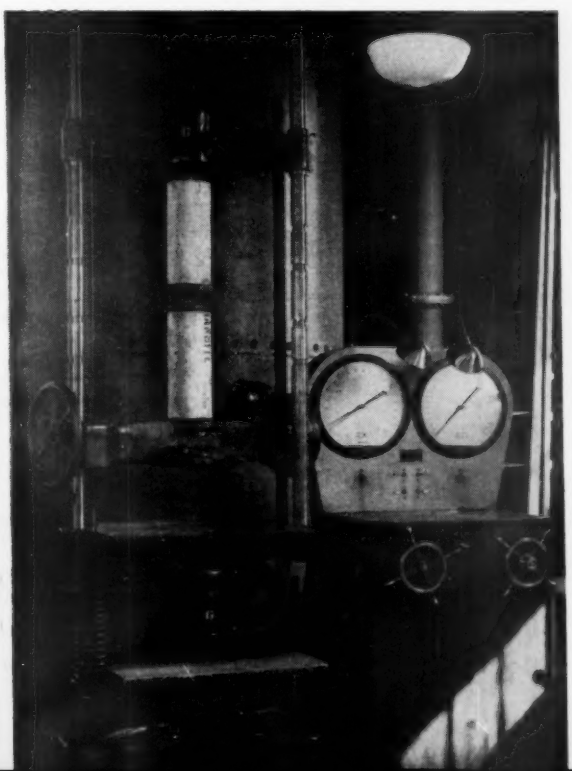


Fig. 5—(Right) Testing machine in the Talbot laboratory on which all the tests were made. The joint being tested is shown in Fig. 1 as No. 5, the 6-in. pipe coupling



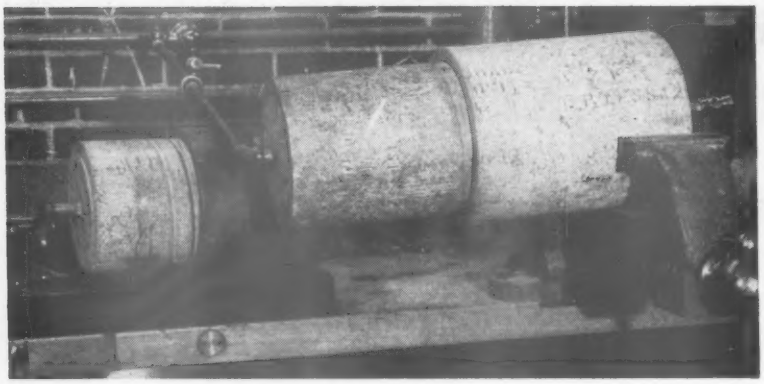


Fig. 6—Equipment for leak test, showing joint 6 (Fig. 1) being tested with air at 200 psi. Joint 4 is in background ready to be tested

devised and tested and are illustrated by scale drawings in Fig. 1 and by photographs in Figs. 2, 3, and 4.

Joint No. 1 was made by beveling two pieces of low-strength 3-in. i.d. flue pipe and joining them by a coupling consisting of two eccentric metal cylinders held together at the center by a metal ring. The inner metal cylinder was cast iron and the outer was light-weight spiral pipe. The inner metal ring and the pipe were grooved for a mechanical bond that would be formed when the space between the inner metal ring and the pipe is filled with any setting material poured in and allowed to harden. The bond in this case was made with sulfur.

The joint was tested to failure by compression at 21,600 lb. It was not tried in tension.

Joint No. 2 consisted of male and female tapered 3-in.-i.d. asbestos cement-flue pipe and a single outside cylinder of light-weight steel spiral pipe, all bonded with sulfur poured into the space between the ring and the inner pipe section, after which the outer section was run into place. This joint was destroyed in compression at 18,000 lb. Joints 1 and 2 are shown in Fig. 4.

A section of 3-in. i.d. asbestos-cement flue pipe (also shown in Fig. 4) was destroyed in compression in order to compare its behavior with that of the jointed pipe. It failed at 25,200 lb. showing that the joint was weaker than the pipe.

Joint No. 3 was made to provide a joint with a positive mechanical bond between the two pieces of tapered male and female 3-in.-i.d. asbestos-cement flue pipe and a cast-iron outer cylinder. Grooves were cut to register in both pipe and coupling and the hollow ring so formed was poured full of type metal. The joint proved stronger than the pipe. (Joints 1, 2 and 3 were made with low-strength pipe and are not comparable with the following tests made on 200-lb. pipe. They would be too weak and too slow in assembly to be practical in the oil field).

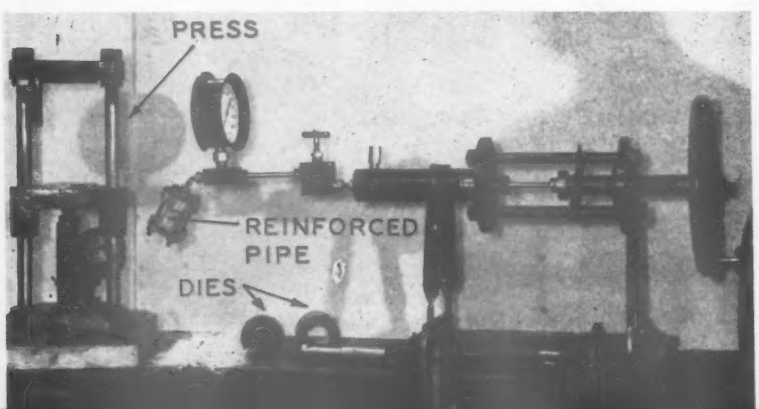
Joint No. 4 consisted of a cast-iron screwed coupling connecting two sections of 5-in.-i.d. 200-lb. threaded asbestos-cement pipe. The threads are one to the inch, the cross-section of the metal thread being one-fourth of the cross-section of the asbestos-cement thread. (Fig. 10). The threads were made by grinding (Fig. 11). The smaller section of the metal presents greater strength to resist stripping than the greater section of pipe, as was shown in the test wherein the joint failed in the pipe thread. This idea should be incorporated in the design of any metal coupling for nonmetallic joints of pipe.

Joint No. 5 is a standard steel 6-in. i.d. line collar, eight threads to the inch, connecting two sections of 5-in.-i.d. 200-lb. asbestos-cement pipe threaded on a standard pipe-threading machine. It is the simplest joint to make because all the work is standard steel pipe practice. (The thread on the pipe should be ground with an abrasive wheel, not cut on a pipe machine.) The test of this pipe compared with the coarser, deeper-cut threads on joint No. 4 just described and joints Nos. 6 and 7 give evidence that the best number of threads per inch for asbestos-cement joints should be somewhere between eight and one thread per inch. Four is suggested. A stainless-steel coupling should replace the ordinary steel. It would be noncorrosive, could be made very light in weight, and is the material recommended for all metal couplings on nonmetallic pipe. Methods of manufacture developed during this war have greatly reduced the cost of stainless steel. Its expense would be divided over the whole pipe line assembly and would therefore be reasonable as it would occupy only one-thirtieth of the length of the line.

Joint No. 6 was the first trial of a full asbestos-cement joint. A coupling of 6-in.-i.d. 200-lb. pipe was threaded, one thread to the inch, and connected to two sections of 5-in.-i.d. 200-lb. pipe similarly threaded. The thread on the pipe was tapered.

Joint No. 7 was of the same size as joint No. 6. The taper was such that the cross-section of the pipe and of the center of the coupling were equal. The asbestos-cement couplings for joint Nos. 6 and 7 lacked the elastic gripping power which is present in steel and plastic couplings.

Fig. 7—The press and dies used in making and the hydraulic pump used in testing glass-fiber-reinforced cement pipe, and plain and reinforced plastic couplings. The test pieces of glasscrete (glass-fiber-reinforced cement) pipe and plastic couplings are made under high pressure in the press and are tested with the hydraulic pump for strength to resist bursting



Tests on Asbestos-Cement Pipe

Compression.—A section of 3-in.-i.d. flue pipe was destroyed by compression in the apparatus shown in Fig. 5 at the Talbot laboratory, University of Illinois, under the direction of Professors Frank Richart and V. P. Jensen. It failed at 14,000 lb. It was not destroyed in tension but it was evident that it would give a poor account of itself. The material is low grade.

Bursting.—A section of 5-in.-i.d. 200-lb. pipe shown in Fig. 2 (top) was tested at the factory to 800 psi. without failure. The ultimate strength is 1,100 psi.

Collapse.—The section of pipe shown in Fig. 2 (bottom) was subjected to 2,000 psi. compression without failure at the Bradford Supply

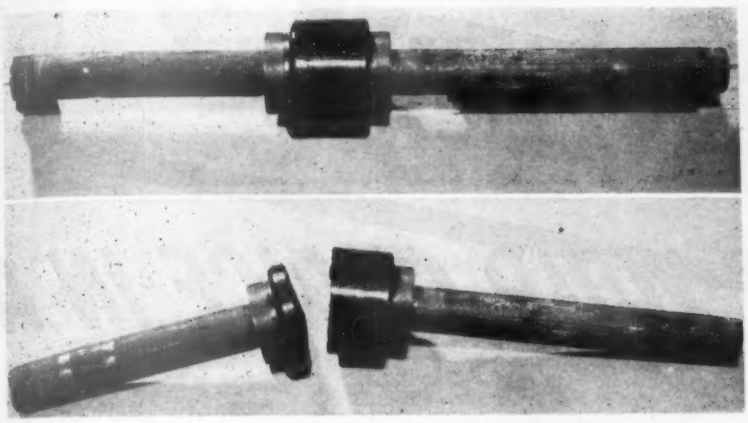


Fig. 8—A 2-in. plastic coupling connected to pipe ready for a tensile test and the same coupling after testing to destruction. The threads did not strip. The coupling parted through the last thread at the center. Reinforcement would give increased tensile strength

Shop at Robinson, Ill. The section shown in Fig. 2 (top) was tested to 1,750 psi. without failure. This specimen consisted of two sections of 4½-in.-i.d. 200-lb. asbestos-cement pipe connected by a pitch fiber coupling. The pipe was prepared by machining the ends of the pipe, placing a rubber gasket at each end, and fitting them with metal caps connected through the pipe with a rod which was tightened with nuts on each end of the rod where it extended through the cap.

The pipe to be tested was placed inside a 7-ft. joint of extra heavy 10-in. casing ending in couplings into which were screwed swedged nipples, one of which was connected to the hydraulic pump and the other to an outlet valve. Air was released at a valve on the top side of the casing.

Valves on the pump would not hold beyond the 2,000 and 1,750-lb. pressures. When removed from the casing the asbestos-cement pipe was undamaged.

These tests prove that the pipe is competent to withstand ordinary salt-water-disposal loads.

Tests for Tensile Strength

Tests for tensile strength were made on the apparatus shown in Fig. 5, at Talbot laboratory, under the direction of Professors Richart and Jensen. They were made primarily to investigate the possibility of using the pipe for cemented-in casing for salt-water-disposal wells.

Joint No. 3 (see Figs. 2 and 3) failed in the thinnest part of the pipe next to the type-metal mechanical bond at 4,600 lb. The material was low-grade flue pipe and the result is not comparable with the other results described.

Joint No. 4 (see Figs. 2 and 3) failed in the thread at the outer edge of the coupling at 20,200 lb.

Joint No. 5 (shown on Figs. 1 and 5) went to 12,700 lb., at which point the plug in the end of the pipe pulled out and the test had to be stopped. On a later test, after the plug had been reset, the thread on the transite pipe stripped at 22,000 lb. This was an important finding as it proved that shallow threads cut on asbestos-cement pipe had great strength.

Joint No. 6 (Figs. 2 and 3) withstood a pull of 28,700 lb., at which point the pipe pulled apart at the point where the pins holding the rod weakened the pipe.

Joint No. 7 (Fig. 1 only) failed in the last thread at center of the coupling at 29,200 lb.

Joints No. 1 and 2 were not tested for tensile strength.

These tests show that tensile strength is sufficient for loads usual in salt-water disposal through surface lines and for cemented-in casing for shallow wells.

Tests for Tightness of the Joints Against Leakage

All the joints from No. 3 to No. 7 inclusive, were tested for leakage with a setup as shown in Fig. 6. Three pressures were used: (1) water at city pressure of 55 psi.; (2) water at pump pressure of 100 psi.; and (3) air at 200 psi. Rubber gaskets were used in most cases but gaskets made of fabric and graphite were equally effective. All the joints were leakproof at the pressures applied, but when used as casing higher pressures will be encountered.

Glascrete

In an effort to find a material which would have the corrosion-resistant qualities of cement pipe and not require the use of asbestos, a scarce material, experiments were tried with cement reinforced with glass fiber. The pipe could not withstand shock although it proved to be a fairly satisfactory material to withstand slowly applied loads. Fig. 7 shows the press and dies with which the pipe was made and the reinforced pipe in the hydraulic testing machine. Glass fibers are pictured between the press and the dies. The same apparatus was used in making and testing plastic couplings.

Results from tests show too much variety to lead to dependable conclusions, but even if the results un-

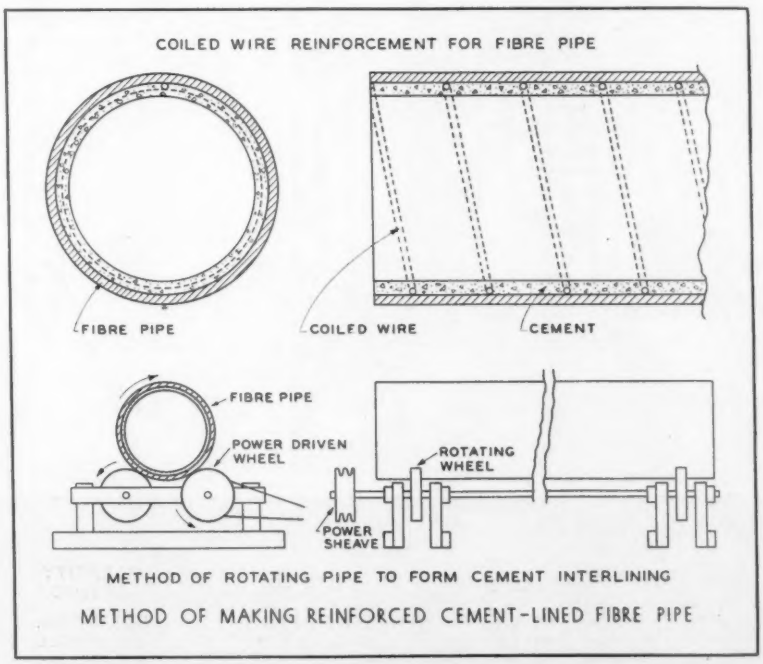


Fig. 9—Illustration of method of lining fiber conduit with cement. Cement lining increases power to resist collapse and metal reinforcement prevents bursting

XUM

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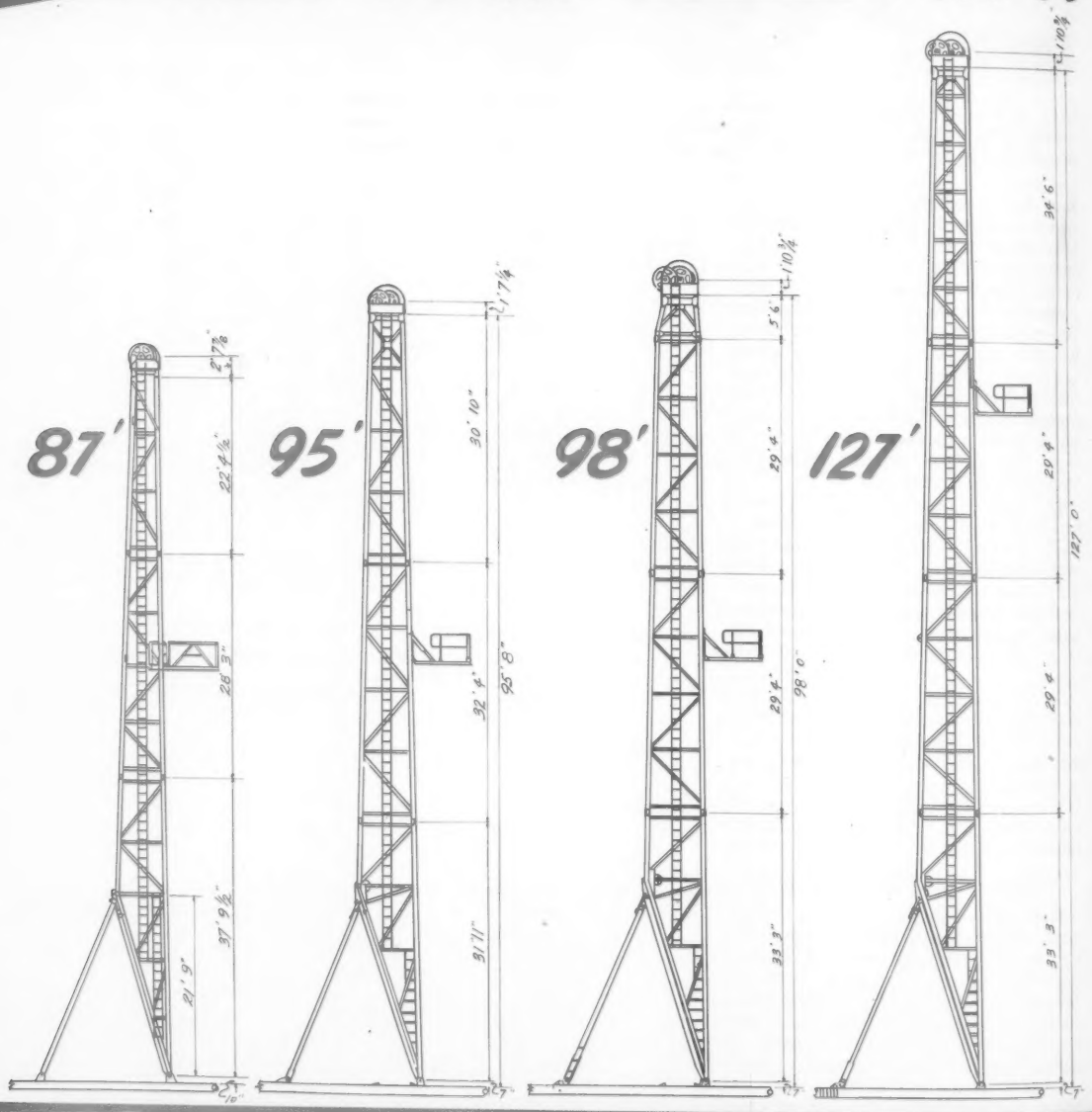

SIZE	SIZE TOP	CAPACITY RATING	WEIGHT WITH STD. SKID BASE
87' x 12'	2'4 1/8" x 3'5 1/8"	300,000 lbs.	29,000 lbs.
95' x 12'6"	3'7 3/4" x 4'2 1/8"	350,000 lbs.	38,000 lbs.
98' x 15'	4'2" x 4'7"	450,000 lbs.	46,000 lbs.
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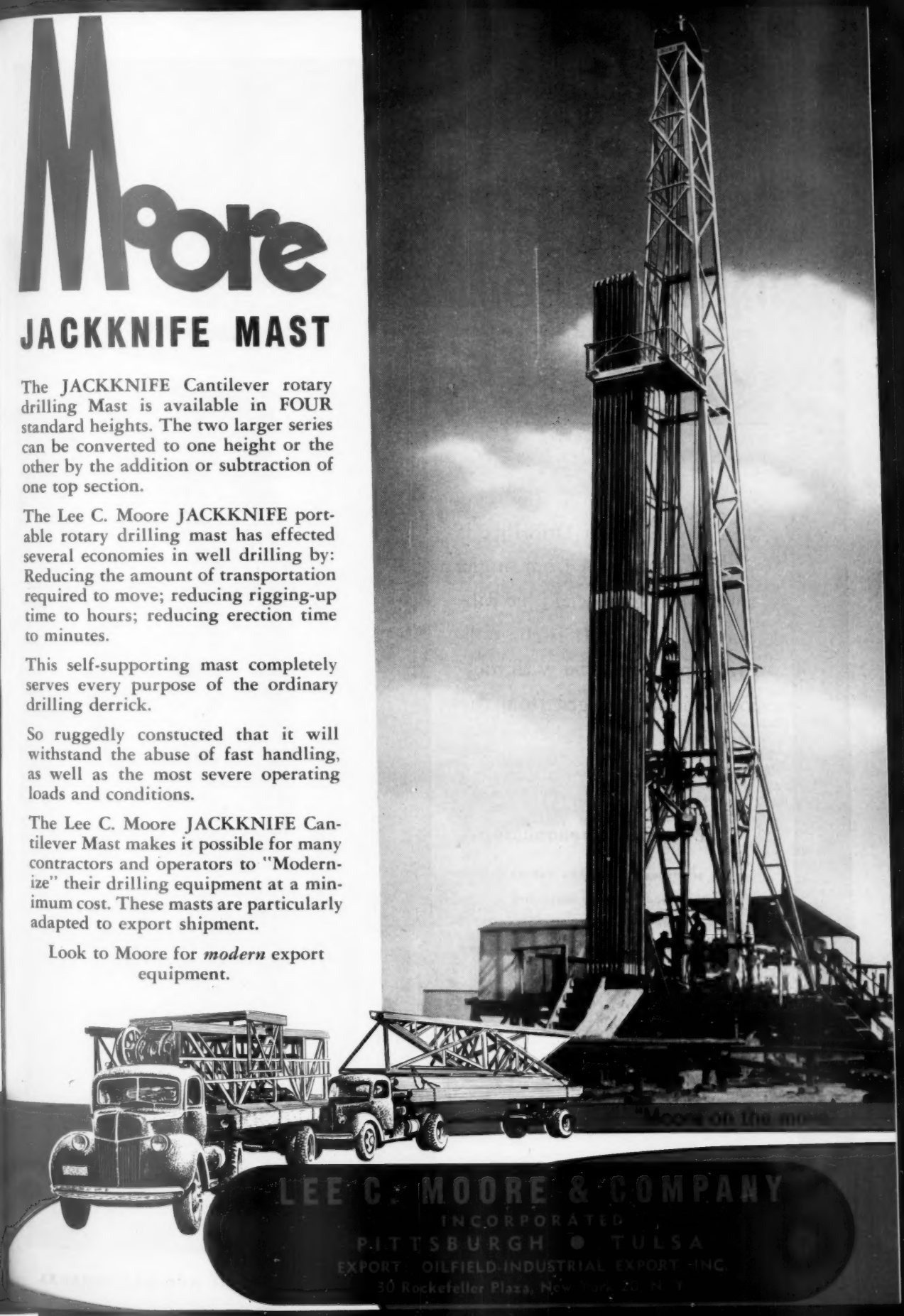

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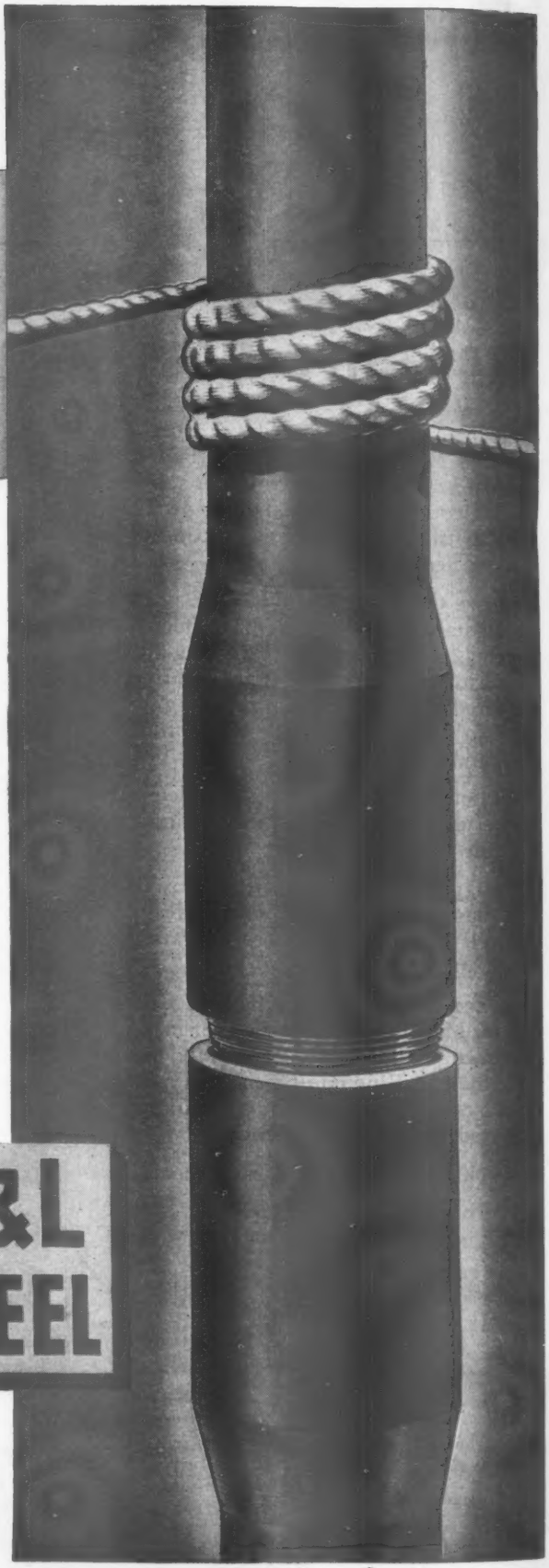

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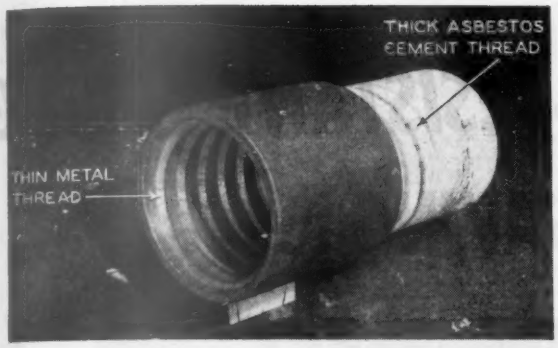
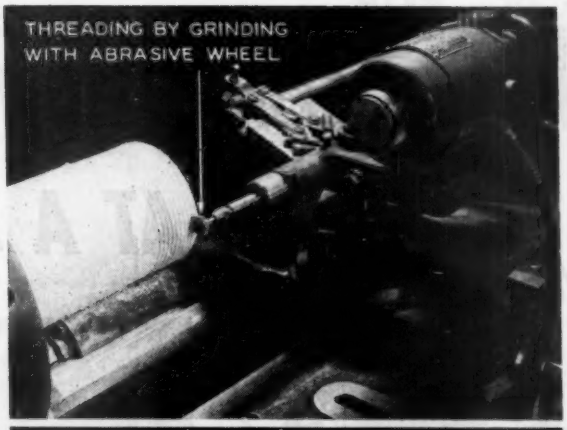


Fig. 10—A metal coupling the projecting thread of which has a thin section, and asbestos cement pipe the thread of which has a thick section. This is an attempt to proportion the cross-section of each material to its relative strength to resist stripping



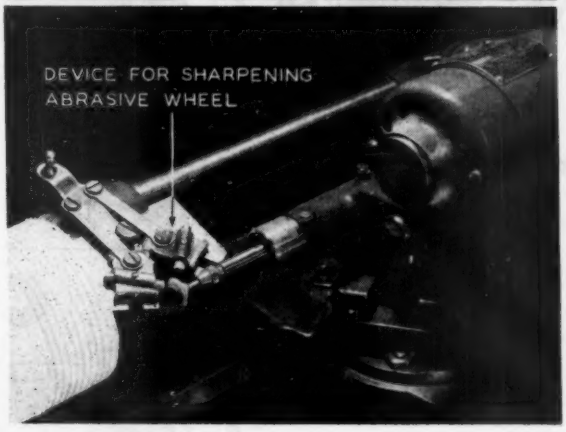


Fig. 11—(Right) Upper figure: High-speed grinding equipment mounted on ordinary lathe, used for grinding exterior and interior threads on asbestos cement or plastic pipe and couplings. Lower figure: Device for sharpening abrasive wheel

der slowly applied loads could be duplicated in manufacture, the material would be too brittle for oil-field usage.

Asbestos-Cement Pipe With Metal Couplings

Asbestos-cement pipe is practical for oil-field surface lines to conduct salt water, and when cemented in it is competent as casing for salt-water-disposal wells of moderate depth. Greater depths may be cased if the casing is floated into a hole full of fluid. The strength of threaded metal couplings on threaded asbestos-cement pipe has been demonstrated in the test of the 5-in. asbestos-cement pipe coupled with a 6-in. steel coupling. Stainless steel combined with asbestos-cement pipe provides a corrosion-proof casing and pipe line.

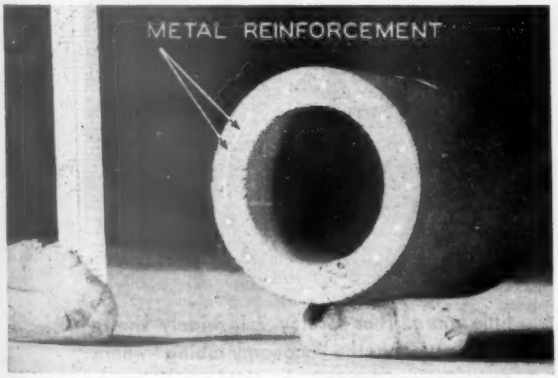


Fig. 12—(Left) Short section of plastic pipe, reinforced with parallel metal rods contacting spiral reinforcement. The pipe has been ground down to expose reinforcement which normally would be entirely covered by plastic

Plastic Couplings

Fig. 8 shows a 2-in. plastic coupling set up for a test to destruction by tension and the coupling after destruction. This was pulled apart in the Talbot laboratory at 2,890 lb. The area of plastic is 3.4 in., so that the strength is 825 psi. A plastic coupling to connect two joints of ¾-in. by 6-in. asbestos cement pipe would have to be 1.1 in. thick to make the plastic coupling and asbestos-cement pipe of equal strength. Since this is rather thick, its cross-section may be reduced by reinforcement. Reinforcing plastics with glass fiber is very successful, and metal reinforcement has given promising results (see Fig. 12). By either reinforcing means, the cross-section of the plastic coupling may be greatly reduced at no expense of strength. The use of plastics instead of cement for protection behind metal or for strength behind nonmetallic casing for wells presents interesting possibilities.

Conclusions

Perfecting of corrosion-proof pipe lines and cemented-in casing has a postwar as well as a wartime use. The investigations outlined in this article are a start in this direction. They demonstrate that asbestos-cement pipe may be successfully threaded by grinding and joined by stainless steel or plastic threaded couplings to form a line sufficiently strong to provide practical pressure surface lead lines and may be cemented in as casing in wells of considerable depth for oil-field salt-water disposal. Strings of corrosion-proof pipe to take smaller loads for the same purposes may be made of threaded fiber pipe united with plastic couplings, and reinforced cement-lined fiber pipe may be used for intermediate pressures and depths. Plastic couplings may be reinforced with glass fiber or metal and used to join either asbestos-cement or fiber pipe.

Acknowledgments

The writer wishes to thank the following for help on this problem: B. G. LeMieux of Fibre Conduit Co., of New York City; Frederick Heath, Jr., of Owens-Corning Glass Corp., Toledo, Ohio; T. N. Thomason, of Corning Glass Works, Corning, N. Y.; Wirt Franklin, formerly of PAW, Chicago; W. C. Hale of South Chester Tube Co., South Chester, Pa.; Halliburton Oil Well Cementing Co., Duncan, Okla.; L. P. Lessard and E. W. Rembert, of Johns-Manville Co., New York; Robert G. Melton, of the research department of Keasbey & Matteson, Ambler, Pa.; Carl Lowrence, of Bradford Supply Co., Robinson, Ill.; R. R. Bradshaw, of Dow Chemical Co., Midland, Mich.; F. E. Richart, and F. P. Jensen, of the Talbot laboratory, University of Illinois; A. H. Bell, A. W. Gotstein, and Robert Urash of Illinois State Geological Survey.

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.0830 in. total—Croloy 5

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1.83%—Croloy 7
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Compounding of Power-Driven Slush Pumps Proves Practical

by E. H. Short, Jr.

AN engineering study of the problems involved in the series operation of power-driven slush pumps was begun by Humble Oil & Refining Co. during the early part of 1944. As a result of this study, specially designed equipment for the compounding of power-driven slush pumps was installed on two of this company's mechanical rigs.

The first installation was made on a rig operating in the Scott & Hopper field, Brooks County, Texas. After completing one well, this rig was moved to the Willamar pool, Willacy County, Texas, approximately 20 miles southeast of Raymondville. The second installation was made on a rig operating in Mississippi.

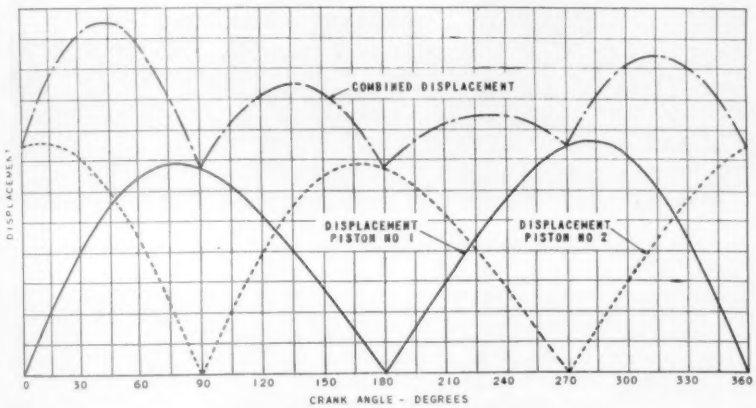
The well now being drilled in the Willamar pool is the sixth well drilled with series operation of the power-driven slush pumps, and aside from a few minor difficulties that are now being corrected, the method employed has proved both practical and satisfactory in every respect.

Mechanical rotary rigs are somewhat handicapped when drilling deep wells because some of the power-driven slush pumps will not maintain the desired rate of circulation necessary for obtaining a maximum rate, when it becomes necessary to reduce liner sizes to obtain required circulation pressures. In cases where the rate of penetration is seriously reduced by lack of volume at the required pressures, additional pumping equipment is sometimes necessary. Power-driven pumps are designed for a maximum frame load which determines the maximum discharge working pressure for any particular size of fluid pistons and liners. For this reason, it is necessary to reduce the size of fluid pistons and liners, as the drilling depth and operating pressures increase, to avoid overloading the pump. This reduction in displacement of power-driven pumps effects a decrease in the return-mud velocity to the extent that cuttings are not effectively removed from the well bore. In some instances, to prevent the slippage of cuttings as a result of reduced return-mud velocities, it has been necessary to resort to the questionable practice of maintaining a drilling fluid of abnormally high viscosity.

While the compounding of power-driven slush pumps has increased the efficiency of the two Humble rigs (which are being used in drilling to approximately 8,000 ft.) the success of the method on wells of this depth opens possibilities for its application in connection with deeper drilling rigs of the near future.

At the outset of the Humble investigation to determine the feasibility of operating two pumps in series, a study was made to define the displacement relationship between the two pistons of a power-driven duplex pump and the combined displacement of both sides throughout a complete cycle. Referring to Fig. 1, it will be noted that four distinct fluid surges occur in the discharge during each revolution of the pump. By superimposing two typical displacement curves, Fig. 2, the result of operating two power-driven pumps in series is illustrated. The ordinate of the curves represents the rate of displacement, and the abscissa the crank position. The curves have been superimposed in order to illustrate the maximum difference in rate of discharge that can occur. The shaded area between the curves, taken over a period of time, for

Fig. 1 — Power-driven pump displacement chart


COMBINED DISPLACEMENT
DISPLACEMENT PISTON NO 1
DISPLACEMENT PISTON NO 2
DISPLACEMENT
0 30 60 90 120 150 180 210 240 270 300 330 360
CRANK ANGLE - DEGREES

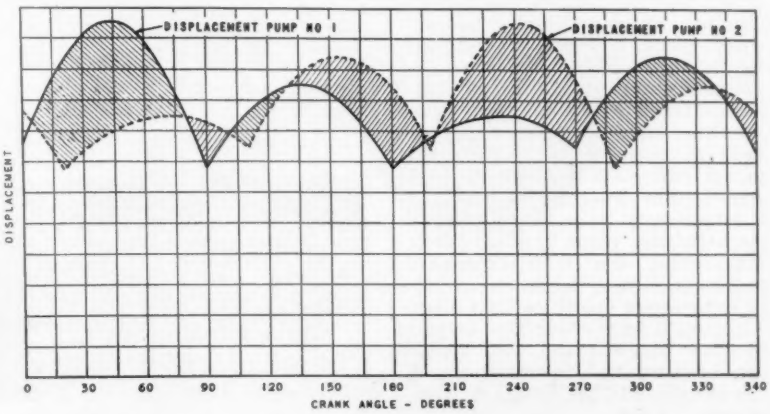

DISPLACEMENT PUMP NO 1
DISPLACEMENT PUMP NO 2
DISPLACEMENT
0 30 60 90 120 150 180 210 240 270 300 330 360
CRANK ANGLE - DEGREES

Fig. 2—Compounded power-driven pump displacement chart

example, as the crank moves from 5° to 80°, is proportional to the difference in volume displaced by the two pumps during the period. This brought out rather clearly that unless some means were provided to compensate for the variation in rate of discharge of the pumps, severe shock loads would be imposed on the pumps and the piping.

To compensate for the uneven discharge rate of the two pumps, Humble engineers designed a special air chamber to provide the necessary cushion for the fluid surges between the two pumps. The chamber itself is 6 ft. in length and has a diameter of 18 in. The capacity of the air chamber was based on the assumption that the trapped air, at operating pressure, should occupy a volume equivalent to eight times the volume of the maximum surge caused by the variation in displacement of the two pumps.

Figs. 3 and 4 present different views of the Humble rig operating in the Willamar pool. It is equipped with two 7 by 18-in. pumps each powered by a 300-hp. multicylinder engine, and another pump powered by the draw-works engine.

During the series operation of the power-driven slush pumps on one of the wells drilled in this area, tests were conducted while drilling from 4,500 ft. down to a depth of 6,000 ft. The high-stage pressure varied from 550 to 700 psi. and at the total depth of 6,857 ft. the pressure increased to 1,100 psi.

The engine driving the high-stage pump was operated at governed speed and the throttle of the engine driving the low-stage pump was adjusted so that this pump maintained the desired operating pressure on the air chamber between the pumps.

It was found that the speed of the low-stage pump engine automatically adjusted itself to operate the pump at the desired speed.

The successful operation of power-driven pumps in series is therefore wholly dependent upon the specially designed air chamber's ability to eliminate excessive fluid surges and shock loads. The net effect gained by this operation is that the rated discharge pressure of the high-stage pump for a particular-size piston and liner may be increased by the delivery pressure of fluid to this pump without exceeding the designed frame load. By this method, a larger liner may be retained in the high-stage pump to greater drilling depths and mud circulating pressures, thereby maintaining higher return-mud velocities than otherwise would be possible. The balance of load between the two pumps can be controlled by regulation of the throttle of the low-stage pump engine.

The Humble investigation and subsequent operation of power-driven slush pumps in series brought out a number of observations which should be followed if efficient performance is to be realized from this method of obtaining a desired rate of fluid circulation. It was concluded that neither pump could be driven with the same engine which drives the rotary, as the pump will operate too slowly to furnish sufficient volume of mud; also the speed variations will be excessive. With the engine of either pump operating at governed speed, the throttle of the other pump can be adjusted to divide the load as desired between the two pumps, and when the throttle is set, the pumps will operate at constant pressure over indefinite periods of time.

An important requisite in the series hookup of power-driven slush pumps is that the air chamber be installed as close to the low-stage pump as practical; and also that the piping design be such as to offer a minimum pressure drop.

Although the special Humble air chamber has not been entirely satisfactory mechanically, sufficiently satisfactory performance has been obtained to prove that the practice of operating power pumps in series is both feasible and advantageous. The greater volume of circulation as a result of series operation of power pumps provides an increase in drilling speed and less trouble from heaving formations and stuck drill pipe. Two power pumps in series have the advantage over one large pump twice their size, of less pressure differential across the valves and pistons and consequently longer valve and piston life.

With the exception of the mechanical trouble on the air chamber, the operation of the power-driven pumps in series has been satisfactory. A third pump was installed on the rig operating in the Willamar pool. It was connected with the two pumps previously used so that any compounding arrangement could be effected, leaving the one pump for repairs or mud-conditioning service.

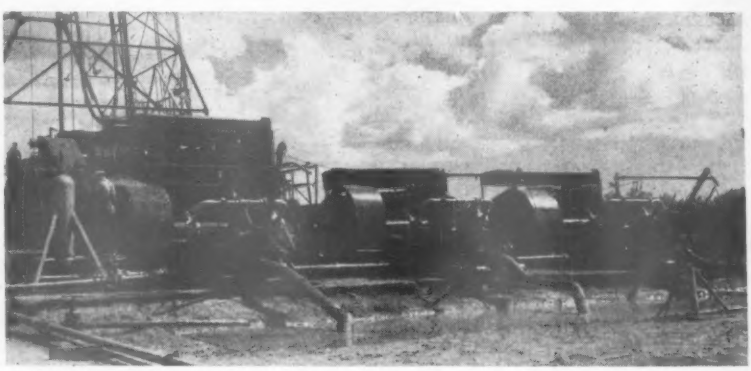


Fig. 3—Slush pump air chamber at extreme left and power-driven slush pumps

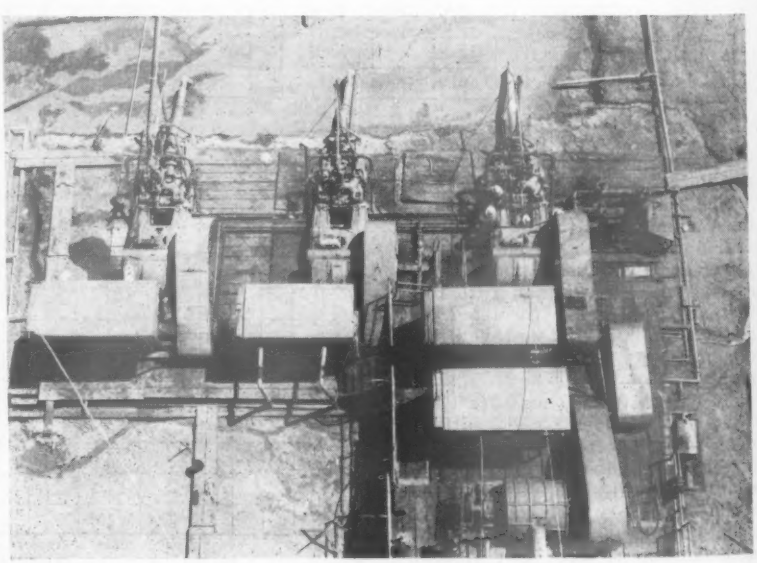


Fig. 4—View showing hookup to slush-pump air chamber, at extreme right

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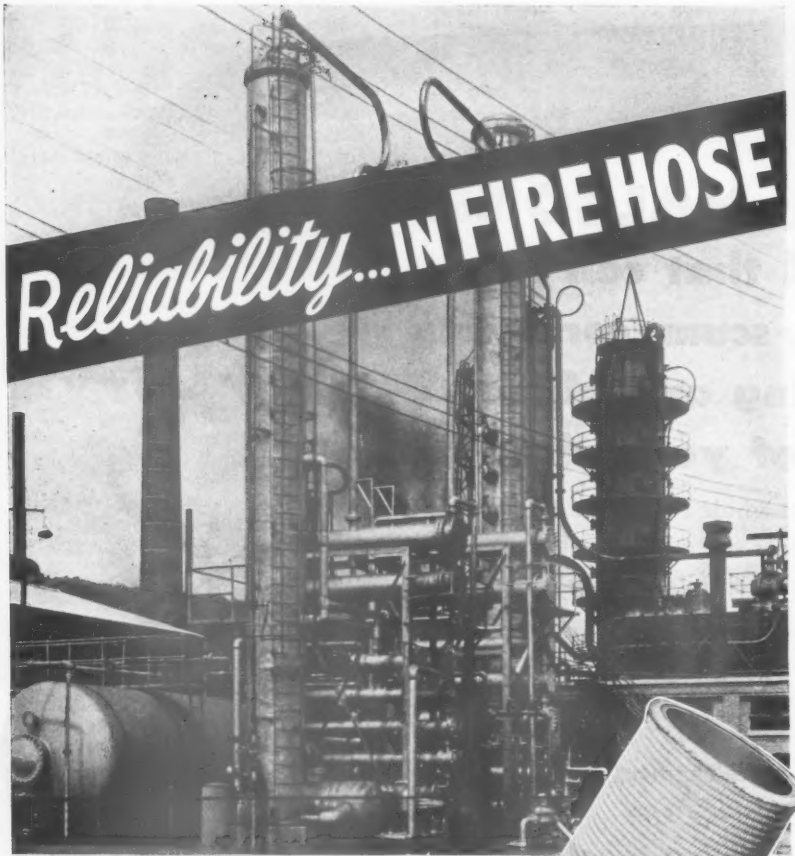

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MODERN *Rotary Drilling Machinery* AND PRACTICES

Part 5—Power and Portability

by W. S. Crake

This is the fifth of a seven-part discussion of modern rotary drilling equipment by W. S. Crake, assistant chief mechanical engineer, Shell Oil Co., Inc., Houston. The first installment was published in the July 7 Journal, and other installments have appeared each week since.

Power Requirements—Hoists

IN any estimate of horsepower required for adequate hoisting speeds, it must be assumed that the speed ratios employed are such that the horsepower exerted by the prime mover can be properly utilized. In other words, if 1,000 hp. is required to hoist a given load at the required speed "off bottom," the hoist ratio must be such that the engine can be fully loaded at full operating speed in one gear, preferably one above the lowest speed, when on bottom. In this case, "on bottom" refers to either the greatest depth or the greatest load for which the hoist is designed to work.

Fig. 1 shows approximate hook horsepowers required to raise loads off bottom at a rate of 100 ft. per minute, which is commonly used as a desirable figure for hoisting rate. Horizontal lines on Fig. 1, such as the dotted line, show equivalent footage capacities or, approximately, "drilling depths" with each size of drill pipe for a given hook horsepower available. In the example shown, a hoist for handling 10,000 ft. of 2⅞-in. drill pipe is suitable for 8,200 ft. of 3½-in. and 6,700 ft. of 4½-in. drill pipe.

It should be noted that Fig. 1 shows hook horsepower, and that the engine horsepower required is considerably higher, due to the multiple sheave and chain transmission from the engine shafts to the hook. Many rigs have been underpowered because of failure to recognize that the power loss in the transmission is so high or because it has been completely neglected when figuring engine horsepowers from hook horsepowers, or vice versa.

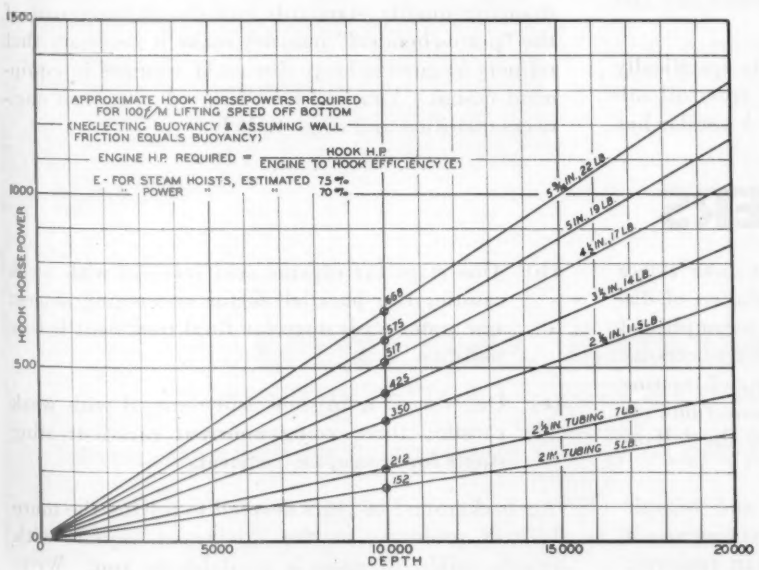

Fig. 1

The horsepower requirements given are believed to form a sound basis on which to provide power for modern high-speed hoisting. Reduction below this point is possible on rigs for use where the number of round trips per well is low and the percentage of over-all drilling time lost by slow hoisting is negligible. On deep wells, as long as the cost of installing the horsepower is not exorbitant, it will pay in the long run to install it, both in reduced loading of the engines and faster drilling times. Any excessive horsepower causes the economic returns to reduce rapidly to the vanishing point. It should be remembered by the operator that extra horsepower only reduces the time to lift the stands when coming out of the hole. This period consists of only 15 to 25 per cent of total round-trip time. Doubling the horsepower could, therefore, only reduce round trip time from 7½ to 12½ per cent.

On workover rigs, which are usually employed on an hourly basis, failure to use adequate horsepower is costly to the operator, especially on heavy workover jobs where full drilling crews are employed. Glorified well-servicing hoists are too often used for service on heavy workover jobs to the detriment of the user. Inadequately powered workover equipment and costly results usually accompany insufficient care on the part of the operator to see that the equipment being used is suitable.

The operator who underpowers or overloads his equipment is usually indulging in a race between losing either his reputation or his shirt, or both. Proper design and economy is a matter of engineering fact and, therefore, sound engineering advice should always be solicited when planning to expend the large sums involved in a modern drilling rig. Once the capacity of the rig is fixed by the original design conditions, any work beyond these conditions, or any substantially different set of conditions, should be carefully

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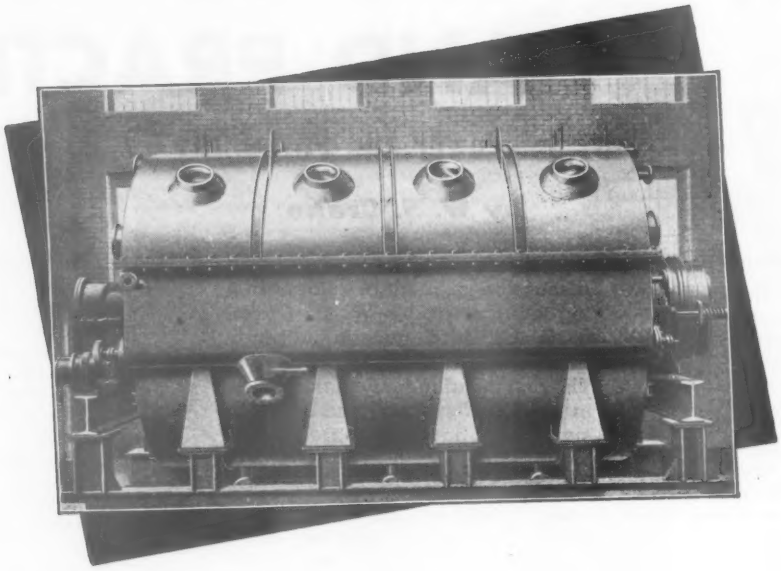

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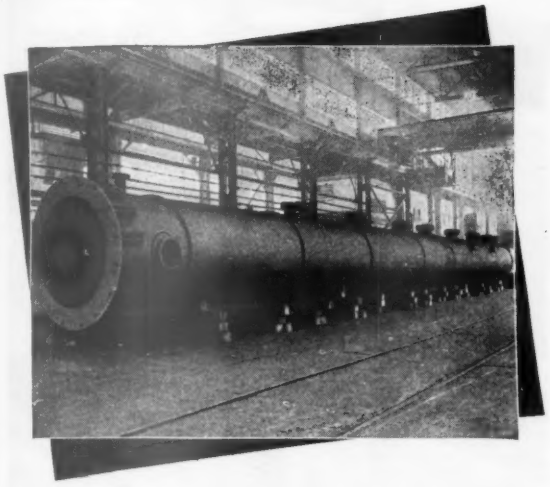

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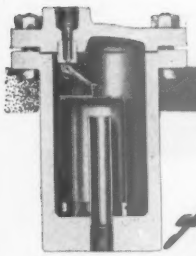

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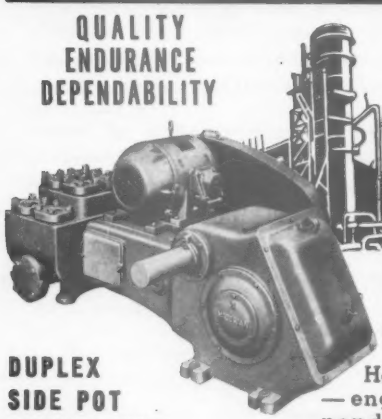

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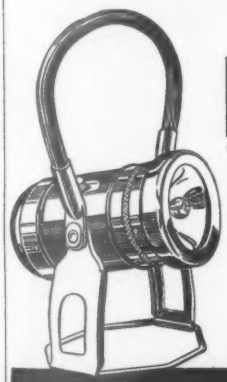

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checked to see how they will affect the equipment. The operator should then act or plan accordingly.

Power Requirements—Pumps

As previously set forth in Article 4 of this series, the pump-horsepower requirements are mainly dependent upon the hole-size drill-pipe combinations with which the rig is to be used.

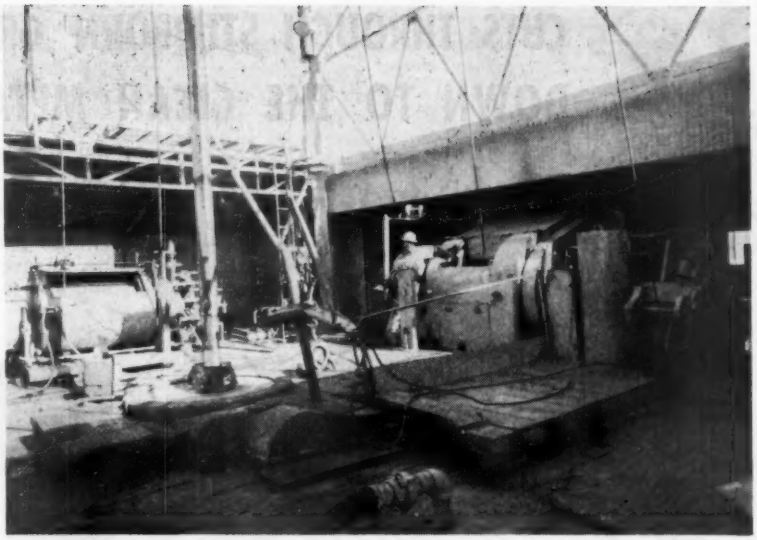
The operator should fix the drill pipe size and type which he intends to use on a drilling rig, to make the "main hole," and on a workover rig, to operate inside certain sizes of casing. Some fairly reliable pressure-loss estimates for the hydraulic system should then be made for the several combinations of hole and drill pipe sizes to be used. This will indicate the range of pressures which the pump is to cover and also, by checking the bit types and sizes expected to be used, the circulating volumes needed to give reasonable velocities in the drill pipe and annulus. The field of available pumps can then be checked to see which one most nearly meets the conditions.

Broad statements regarding the pump horsepowers required for a given depth of drilling are not possible unless qualified by a description of the hydraulic system. It can be stated, however, that a given rig with a certain "cellar drilling depth" with one string of drill pipe may go to a considerably greater depth, with economy, by increasing the drill pipe to the next larger size as long as the hoist capacity is not greatly exceeded. Increased drilling time on bottom, better bit performance, fewer round trips, and lower pump operating cost will usually more than compensate for higher drill-pipe string weights.

Auxiliaries and Standby

Auxiliaries on steam and power rigs consist of such items as electric generators, washdown pumps, blow-out-preventer supply pumps, and air compressors. On most heavy modern rigs a separately powered electric welding generator is an invaluable addition. Most of these auxiliaries are installed in duplicate on heavy rigs. Power rigs generally use a small engine to drive the various auxiliaries, and steam rigs power all auxiliaries by steam. Such auxiliaries are almost invariably skid mounted as units.

On the main hoists and engines, auxiliary hoists are not used since the main units themselves are generally very reliable. On power rigs the power supply is split into two or more engines so as to provide alternative power in case of failure of one engine. On steam rigs, the engine is generally reliable enough to make standby practically unnecessary. On ultra-deep wells, however, where even a small risk of bad fishing jobs or losing a high hole investment is undesirable, it is probably wise to consider the use of an "inching hoist" installed on the dead line. This hoist should be independently powered and capable of raising and lowering the drill pipe string about 50 ft. so as to "pass collars" and reduce sticking hazard, in case of failure of the main hoisting equipment. This hoist need only be capable of hoisting the hook at a rate of, say, 5 ft. per minute and thus would require installation of only about one-twentieth of the horsepower of the main hoist engines. The drum would, however, be of heavy-duty construction and should be large enough to provide storage space for the excess wire rope carried at the dead line end.



Hoisting equipment on large deep-drilling steam rig showing heavy-duty draw-works assembly (right) and wire-line reel (left)

Power Distribution

(a) Steam.—Steam power distribution is simple and efficient if proper steam line sizes are used. Its chief advantage is its flexibility and simplicity, and its ability to deliver full required horsepower, within the boiler capacity, to any engine connected to the steam line. In this way the drilling engine can be fully powered and the pumps, or combinations of pumps and engines, can take any desired proportion of the steam available. Since there is no mechanical interconnection between engines, they can be run at any desired speed without interfering with the performance of each other. Insofar as flexibility and simplicity are concerned, this is a highly suitable form of power distribution for a rig.

(b) Internal combustion—direct drive.—This drive uses two, three, or four engines in the power plant. These engines are conventionally installed in line behind the hoist and are coupled to the hoist forward and back to the pump at the rear of the engines. The grouping of engines into the hoist or pump can be made in any combinations desired, except crossover connections which are expensive and generally unsatisfactory. If a dual-engine drive is used, the engine nearest the rig drives the rotary and the rear engine drives the pump, and both are coupled for hoisting. Since the rear engine is not, as a rule, of sufficient horsepower capacity to power the pump to full load, the two engines must be coupled together while drilling when the pump load exceeds the capacity of the rear engine, thus mechanically tying the rotary and pump together. While a selection of three speeds is usually available on the rotary drive, any mechanical connection of the two engines is undesirable and often causes bad loading of both engines and reduces drilling progress. Sensitivity and selectivity of control of both pump and rotary are sacrificed by this connection.

Where only one pump is to be run at a time, even if another is installed as a standby, the use of a minimum of three engines is highly desirable. The engines should be large enough that one alone is capable of driving the rotary up to the full normal load. The rotary engine, or the one nearest the hoist, will then be entirely used for driving the rotary while the other two engines can be used for the pump, either singly at light pump load, or in parallel on heavy pump loads.

On deep rigs, where one main pump is needed for drilling and a second pump, often one size smaller than the main pump, is used simultaneously for mixing mud or other

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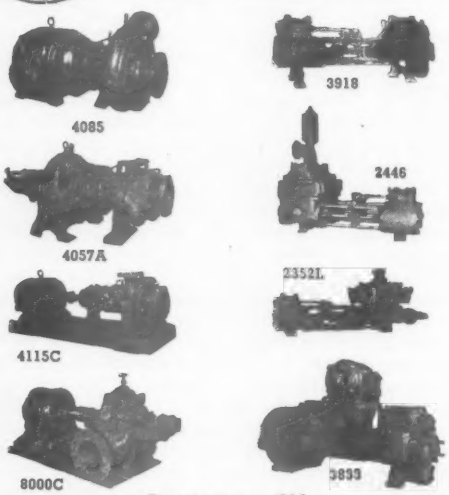

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service, a four-engine hookup is desirable. The most flexible hookup is one in which the rotary engine is reserved for the rotary, the second engine shaft extended to drive the lighter, or No. 2, pump and the drilling, or No. 1, pump is driven from behind the rear engine. In this way either No. 2 or Nos. 2 and 3 engines can be used for the No. 2 pump, or No. 3 or No. 4 or Nos. 3 and 4 engines for the No. 1 pump. In the event of any one engine being out of service, the rig can usually proceed with drilling at almost full capacity.

The use of independently engined pumps is sometimes adopted, but this provides an engine whose sole use on the rig is for operating the one pump. By coupling the extra engine into the main rig transmission, a greater range of use is given to the engine and the over-all rig flexibility is greatly increased. An individual unit which provides sufficient engine horsepower to power most pumps to full load is also very clumsy to handle.

Independent rotary drives, using one engine and a transmission, mounted on the rotary skid, are in use. Since this properly requires an engine equal in size to one of the hoisting engines, it is expensive and cumbersome. It also results in poor usage of engine horsepower for the same reason as the independently powered pump. Multiple-engine mechanical drive provides a rig of reasonable economy in original cost up to a medium heavy-duty rig of, say, up to 700 engine horsepower. On the heaviest-duty rigs the most desirable assembly of transmissions and engines becomes both expensive and cumbersome and begins to lose flexibility.

Internal Combustion—D.C.-Electric

This system, using the engines to generate direct current electricity, distributes the power generated to the various rig parts through cables. The power-distribution characteristics of this type of rig are as good as steam, and are even better for certain delicate work because electric motors provide an almost dead-smooth flow of power output as compared with the large power impulses of steam-engine cylinders.

With the electric drive, as with steam, all engine power can be directed into the hoist, the pumps can be fully powered, or a direct-drive rotary can easily be driven by a motor. Due to the almost invariable use of Ward Leonard type controls, however, the generators have to be switched into separate groups suitable for driving each main feature, such as pump, rotary, or hoist. This latter is, however, a minor disadvantage.

On heavy drilling rigs, using internal-combustion engines as a power source, the maximum use of engine power available, least overload on engines, easiest rigging up, simplest hoists, greatest flexibility of control, and most suitable power characteristics are obtainable with d.c.-electric drive. The main field of this drive, due to its high original cost, is in the heavy rig class, in which suitable mechanical drives become so expensive and cumbersome.

Internal Combustion—Hydraulic

Hydraulic drives are, as previously stated, in the early stages of development on oil-field machinery. They offer the possibility of performance and flexibility equaling the electric drive but, as at present understood, will still require the complexity of a considerable mechanical transmission behind the hoist.

Rig Assembly and Breakdown

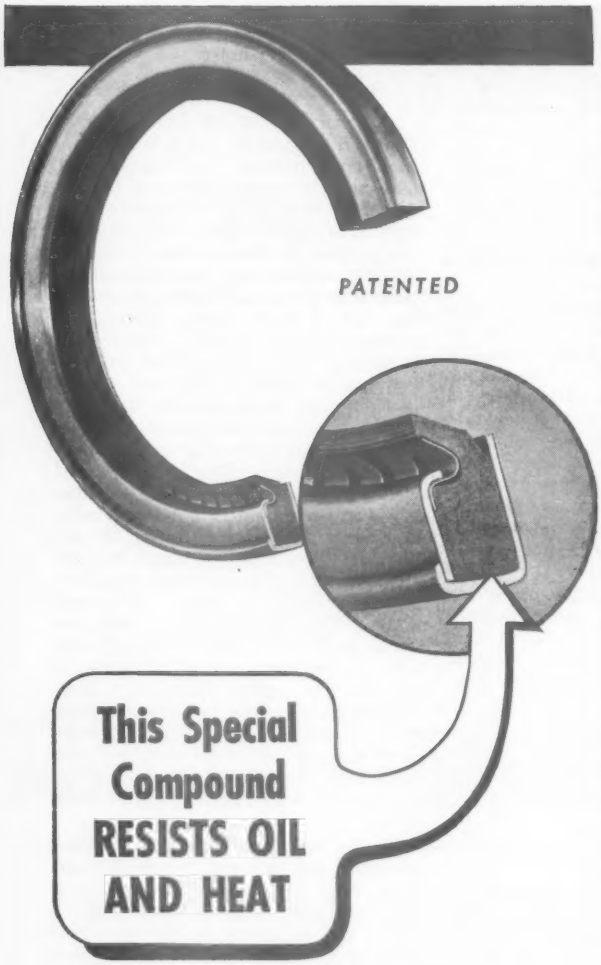
Modern rigs of all sizes are constructed in as large pieces or units as can conveniently be transported. The past 10 years have seen a complete revolution in drilling-rig unitization and portability, with the primary view of simplifying and accelerating rigging up and dismantling time and reducing losses and wearing out of parts when moving. A complementary result, which has probably had more effect on improving machinery life and reducing over-all drilling costs than the reduced moving and assembly time, has been the enclosing and improving of machinery. This improvement was only possible after the machinery was permanently built into suitable units. Precision clutches, drives, bearings, and shafting could not be used when continually taken apart and subjected to mud, dirt, and water. Drilling of today's deep, or even shallow, oil fields would still be inordinately expensive, were it not for the use of precision transmissions and proper lubrication. The same remark applies to the high loads successfully carried by today's light rigs, which would not have been practical without these refinements.

In selecting drilling machinery, the operator can always be sure that any chain drives which are not fully enclosed and properly lubricated will be costly to operate and demand high replacement costs when compared with fully enclosed drives.

Modern heavy mechanical-power hoists have now become so large that they cannot be built in units which can be transported in one piece. These are necessarily broken into two units for transportation and thus lose some of their ease of portability.

As briefly mentioned in a previous article, unitization can easily be carried to extremes such that the ability of the rig to drill at the maximum possible speed can be impaired. While some drilling speed can be sacrificed for portability on rigs used for shallow drilling, this is a direct function of the ratio of rigging-up and tearing-down time to total drilling time. In rough figures, whenever the rigging-up and tearing-down time of the equipment amounts to less than 10 per cent of the total drilling time, which includes the rig-up and tear-down time, none of the drilling capacity of the equipment should be sacrificed for portability. In general, the first objective is to select equipment which will drill the wells at the maximum possible rate and then to devise means to make this equip-

Motor-driven mud-pump installation on large diesel-electric drilling barge rig. Pumps are heaviest consumers of power



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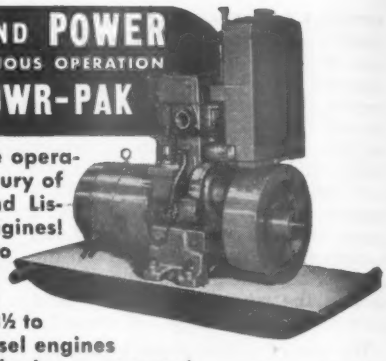

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ment as portable as possible. There have been numerous examples of rigs in the field which have been rigged up and torn down with commendable rapidity, but which have been unable to drill the well with any degree of satisfaction or speed after being installed.

In case of a sizable drilling campaign, higher average drilling speed can generally be obtained by proper organization of the drilling program to give continuous rig work than by saving valuable drilling-rig hours each move and then losing them many times over by poor work scheduling.

Limits of Portability

Definition of the term "portable drilling rig" is somewhat difficult, since all modern rigs are "portable" and vary from complete rigs on wheels to the heavy rig consisting of many heavy pieces. Several factors must be remembered when considering the limits of portability and these may be summarized as follows:

1. The maximum weight of any piece which may be loaded on transport units and be taken over the highways. In case of units mounted on permanent wheels, the fact that bad roads and operating terrain may cause easy "bogging down" of heavy units must be considered.

2. The depth of wells to be drilled and the expected drilling time determine whether expensive wheels, tires, and frames can justifiably be tied up purely for transportation reasons or whether conventional transport units should be used for moving the rig.

3. Drilling loads are heavy and fatigue inducing, due to heavy vibration. Rig frames, transmissions, etc., must therefore be of heavy or fatigue-resisting construction and if metal needed for this purpose is sacrificed for portability, the rig life may be short and dangerous accidents may occur in its use due to failures of important parts.

The limiting weight of any single piece, including the mounting, depends upon highway allowances in the territory where the rig is to operate. More than one piece can often be joined together and skidded within a field, or even hauled as an emergency overload by special equipment. In Texas, an 8-ft. width is the maximum permitted on most highways. The length can be up to 35 ft., including the truck or mounting. The height, when mounted on truck, generally cannot exceed 12.5 ft. to pass under many highway bridges. The weight, including the truck, in most cases cannot exceed 48,000 lb. These dimensions can be exceeded in many cases under special permit and vary in different states.

The use of much light-weight metal, especially in parts not involving vibration or fatigue, will undoubtedly increase the drilling capacity of mobile machinery after the war, but discretion will have to be used in the use of high-strength or light-weight metals because of the fatigue problem. Much excess weight can be cut from the heaviest equipment, such as slush pumps, by compact design and the use of heavy metals only where needed for strength.

At the present time, light-power rigs are in successful operation and are enjoying increasing use and favor for soft-formation drilling to 4,000 ft. and down to 5,000 ft. in medium hard drilling. These light rigs are largely wheel mounted and are used with telescopic or folding derricks. They are often equipped with an extra separately driven pump to accelerate drilling in soft formations. Since the total number of round trips per well is small at the depths and in the formations mentioned, and the ton mileage service demanded of the hoist is correspondingly small, engines can be reasonably overloaded on hoisting service for this short period and still give good service.

Medium-power rigs are usually of the skid type built in two or three main units and are used for as deep as 8,000-ft. drilling in hard or medium hard formations and 7,000-ft. in soft formations. The use of portable derricks of the cantilever or telescopic type is common with this class of rig, which is also in wide use on well workover service. Steam rigs are still in wide use on this particular class of well, especially in soft-formation proven fields on development work, where they still achieve maximum drilling speed and good portability.

Heavy power and steam rigs of low "portability" are generally in use on wells below 8,000 ft., with steam rigs still predominant, especially in soft and medium drilling service. Internal-combustion-engined rigs are used for hard formation drilling and on many deep wildcats because of their suitability and operating economy.

Strength of Unit Mountings

When building up heavy units, the frames supporting them are largely required for keeping parts together during transportation. When operating, low stresses are often carried in skids and frames, but when roughly handled and suspended in long spans for transportation, much heavier construction is needed. If skids, substructures and so forth are made "truck-driver proof" so that they are strong enough to withstand the transportation hazards without bending or breaking, the operator can feel almost certain that they are more than sufficiently strong to withstand the operating loads. Any frames or substructures used must be very heavily braced to withstand the reciprocating loads of engines, unbalanced hoist drums, and acceleration and deceleration loads of drilling. These heavy vibratory stresses must be carried to the ground by proper structural design. In this way the proper amount of metal used in the right places is more effective than a considerably greater amount of metal incorrectly applied.

Foundations and Rigidity

On assembling rigs, care must be taken to provide as rigid foundations as possible. Grillage and mats make excellent drilling foundations, if properly installed with good bearing on the ground. Shaking derricks, substructures, and hoists are dangerous in that the fatigue of parts takes place rapidly by heavy secondary induced forces, for which the machinery designer cannot provide. Poor foundation work, especially on deep wells, is not a true money or equipment saver. On heavy-power rigs, where the machinery stretches so far behind the hoist, proper alignment of chains, belts and engines is essential. Good foundations are therefore necessary in order to obtain economical performance from the rig.

When comparing the costs of various types of rigs, it is necessary for the operator to add to his rig the cost of all the substructures and foundations required for installing of the rig. The investment in these foundations often runs into a major item of rig cost and varies considerably with the type of rig used. In locations requiring piling or other expensive foundations, this comparison becomes even more necessary.

When assembling new rigs of the heavy or medium-heavy types, there is an increasing tendency to design and build all substructures, foundations, built-in piping, manifolds, and, in fact, to rig up the outfit as completely as possible at some center of supply and manufacture. This is because, in most cases, properly engineered structures, walkways, buildings, and piping are much more economically constructed by competitive bidding in manufacturing centers than by field crews. It has been found that the time of rigging up a new rig on the well can be cut 50 per cent or more by this method. The reduction in waste of highly trained drilling manpower, better availability of necessary construction materials, supplies and methods, all combine to result in a rig which will go together and stay together better in the field and at a more reasonable over-all assembled cost to the operator.

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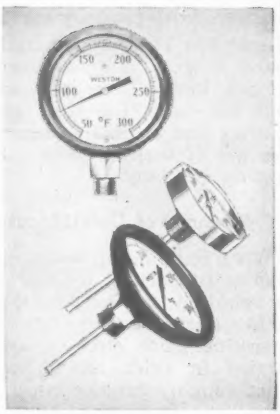

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Economic Survey of Thermofor Installations in Socony-Vacuum Lubricating Oil Refineries

by H. C. Myers* and R. M. Owen†

AS a result of the interest currently being shown in Socony-Vacuum Oil Co.'s Thermofor kiln‡ by companies contemplating expansion of their lubricating-oil processing facilities, a survey has been made of Socony's Thermofor units at its Buffalo, Olean, Queens, Paulsboro, and Beaumont refineries to collect the following information for consideration by interested companies:

1. Economic comparisons of Thermofor kiln and previous methods of adsorbent regeneration in the various refineries.

2. Basic labor, repairs, maintenance, and utility costs for kilns of varying capacities.

The data from the survey of each commercial Thermofor kiln installation was used to determine the approximate amount of fresh adsorbent necessary to maintain the average filtration efficiency of the Thermofor regenerated decolorants at the same level as that obtained by previous methods of adsorbent regeneration. With the equivalent percolation efficiencies, the filtration expenses are the same when utilizing either type of reactivated adsorbent. Calculations were then made, in which the relative rate of decrease in filtration efficiency was reflected in adsorbent purchases, upon repeated regenerations of either decolorant.

Basic labor, maintenance, and utility costs were obtained by averaging the data for the complete period of Thermofor operation in each refinery.

*Research and Development Laboratories. †Refinery Engineering Division, Socony-Vacuum Co., Inc.

‡Licensed by Max B. Miller & Co.

Conclusions

1. The installation of Thermofor kilns in Socony-Vacuum refineries has resulted in substantial reductions in filter-plant operating expenses. The extent of these savings varies, depending upon size of the installation, the efficiency of the previous adsorbent utilized and the method of adsorbent regeneration employed. The savings from the five commercial units indicate an average pay off period of the kiln installations of about 8-9 months. The principal savings in Thermofor operation, as shown in this study, are effected in reduced adsorbent purchases with minor savings in fuel, power and repairs and maintenance.

2. Thermofor reactivated adsorbents maintain their filtration efficiency upon repeated regenerations better than retort or multiple hearth regenerated adsorbents, which is reflected in lower clay makeup to the Thermofor system. Estimated additions to the Olean adsorbent system during 58 months of Thermofor operation are about 11 per cent of

TABLE 1—COMPARISON OF ADSORBENT REGENERATION EXPENSES BY THERMOFOR AND MULTIPLE HEARTH-ROTARY KILN OPERATION IN A REFINERY PROCESSING PENNSYLVANIA LUBRICATING OILS AND WAXES[1]
(Basis—1,000,000 Gal. Solution Filtered)

Adsorbent Regeneration Equipment	Multiple Hearth and Rotary Kilns[2]	Thermofor Kiln
Rated kiln capacity, tons/24-hour day	....	50
Kiln investment, dollars[4]	....	7,000
Adsorbent regenerated	Fuller's earth	Fuller's earth
Tons of adsorbent regenerated	1,704	1,704
Tons of adsorbent purchased/ton adsorbent regenerated	0.169	0.019[3]
Gallons solution filtered/ton adsorbent regenerated	587	587

Adsorbent Regeneration Expenses	Thermofor Operating Expenses as % of Multiple Hearth-Rotary Operating Expenses	Differences Between M.H.-Rotary and Thermofor Operation in $/Million Gal. Solution Filtered
Labor	100	0
Repairs and maintenance	94.3	43
Fuel	76.1	88
Power	19.1	304
Adsorbent losses and discard	11.8	6,050
Total expense	30.1	6,485
Savings[5]	69.9	6,485
Estimated savings operating at kiln capacity, $/year	....	69,400

1. Based on Olean cost data for a 58-month operating period.

2. Adsorbent discarded after five reactivations or about 2 months' service in multiple hearth-rotary kilns. Average percolation efficiency about 75 per cent that of fresh burnt clay.

3. Estimated fresh adsorbent additions to replace losses and maintain over-all adsorbent efficiency equivalent to that obtained by previous multiple hearth-rotary operation. Estimate based on actual loss in efficiency of Olean adsorbents.

4. Original investment adjusted to present level by assuming a 25 per cent increase in material and a 40 per cent increase in labor costs.

5. Materials filtered consisted of cylinder stocks, petrolatums and S.A.E.-20 motor oils all in 60 per cent oil-40 per cent naphtha solution.

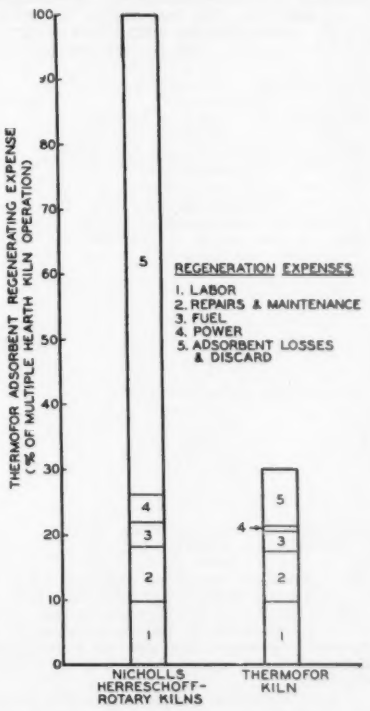

Fig. 1—Average cost comparison of Thermofor and multiple hearth clay regeneration expenses in a refinery processing Pennsylvania lubricating oils and waxes

those required for multiple hearth-rotary operation at the same over-all adsorbent filtration efficiency. The Olean multiple hearth-rotary decolorants were formerly replaced after five regenerations or 2 months of service. Estimated additions to the Paulsboro adsorbent system during 50 months of Thermofor operation are about 34 per cent of those required by comparable multiple-hearth operation. The Paulsboro multiple-hearth adsorbent deteriorated to the same efficiency level as the Olean decolorants after 10 regenerations or 4 months of service. Bauxite, on the other hand, after 350 regenerations in the Queens kiln, during which adsorbent additions only replaced losses, apparently still retains its original decolorizing efficiency.

The data from the Paulsboro, Olean, and Beaumont refineries indicate that, exclusive of losses, about 0.9 per cent of the adsorbent should be replaced per cycle of regeneration in the Thermofor kiln to maintain over-all Thermofor adsorbent efficiency at 75-80 per cent that of fresh burnt clay. The Queens and Atlas data, however, indicate that no adsorbent replacement, other than that necessary to replenish losses, is required when regenerating bauxite.

3. The incorporation of automatic safety and control devices on Thermofor units, such as automatic control of salt and kiln temperatures; coupled with elimination of the salt heating furnace and auxiliary heating of the salt tank and combustion air, should greatly improve and cheapen Thermofor operation. On the smaller kiln installations, manpower requirements could probably be minimized to where personnel could be partially released for other duties whereas on larger installations the result would be smoother and safer operation.

4. The various Thermofor units as originally installed possessed certain features which are common to all new installations. However, all the major difficulties encountered have been alleviated by changes in design and the incorporation of several safety and control devices. These alterations are reflected in the high repairs and maintenance costs for the Paulsboro and Olean kilns, which were to a great extent large scale experimental units.

A—Adsorbent Regeneration Cost Calculation

1. **Olean Thermofor unit.** — The data in Table 1 and Fig. 1 are based upon the results of 58 months of Thermofor kiln operation at the Olean refinery on 30-60 mesh Attapulgus clay. Estimated clay additions necessary to replace losses and to maintain over-all percolation efficiency substantially the same as that encountered in previous multiple hearth-rotary operation, were about 0.7 per cent of the adsorbent processed per cycle of regeneration. Multiple hearth-rotary clays, employed previously, were discarded after five regenerating cycles or 2 months service due to their rapid decrease in percolation efficiency to about 50 per cent that of fresh burnt clay. Oils filtered through both types of regenerated adsorbent consisted largely of cylinder stocks, petrolatums, and S.A.E.-20 motor oils, all in naphtha solution.

The data indicate that the average Olean clay regeneration expenses for the 5-year period, in which the average Thermofor clay efficiency was substantially the same as that of previous multiple-hearth clays, were about 30 per cent of those incurred by utilizing Nichols Herreschoff-rotary kiln reactivated adsorbents. The principal saving was in reduced clay purchases with minor savings in fuel and power. It is estimated that the above savings would pay off the cost of the kiln installation in about 7 months.

TABLE 2—COMPARISON OF ADSORBENT REGENERATION EXPENSES BY THERMOFOR AND MULTIPLE HEARTH KILN OPERATION IN A REFINERY PROCESSING MID-CONTINENT LUBRICATING OILS AND WAXES[1]
(Basis—1,000,000 Gal. of Oils and Waxes Filtered)

Adsorbent Regeneration Equipment	Multiple Hearth Kilns[2]	Thermofor Kiln
Rated kiln capacity, tons/24-hour day	....	170
Kiln investment, dollars[4]	....	110,000
Adsorbent regenerated	Fuller's Earth	Fuller's Earth
Tons of adsorbent regenerated	652	652
Tons of adsorbent purchased/ton adsorbent regenerated	0.0911	0.0311[3]
Gal. oil and waxes filtered/ton adsorbent regenerated	1,533	1,533

Adsorbent Regeneration Expenses	Thermofor Operating Expenses as % of Multiple Hearth Operating Expenses	Differences Between Thermofor and Multiple Hearth Operation in $/Million Gal. Lubricants Filtered
Labor	100	0
Repairs and maintenance	99	1
Fuel	67.7	41
Power	80	8
Water	1,295	—21
Adsorbent losses and discard	38.4	845
Total expense	53.0	874
Savings[5]	47.0	874
Estimated savings operating at kiln capacity, $/year[6]	....	105,700

1. Based on Paulsboro cost data for a 50-month operating period.
2. Adsorbent discarded after ten reactivations or about four months service in multiple hearth kilns. Average percolation efficiency about 75 per cent of fresh burnt clay.
3. Estimated fresh adsorbent additions to replace losses and maintain over-all adsorbent efficiency equivalent to that obtained by previous multiple hearth operation. Estimate based upon actual loss in efficiency during regeneration of Paulsboro adsorbents.
4. Original investment adjusted to present level by assuming a 25 per cent increase in material and a 40 per cent increase in labor costs.
5. Materials filtered consisted of bright stocks, neutrals, petrolatums, ceresin, and paraffin waxes; both straight and in naphtha solution.
6. The Paulsboro Thermofor kiln although rated at 170 tons/24-hour day has been consistently processing 216 tons/24-hour day of fuller's earth. The latter rating has been used in determining savings.

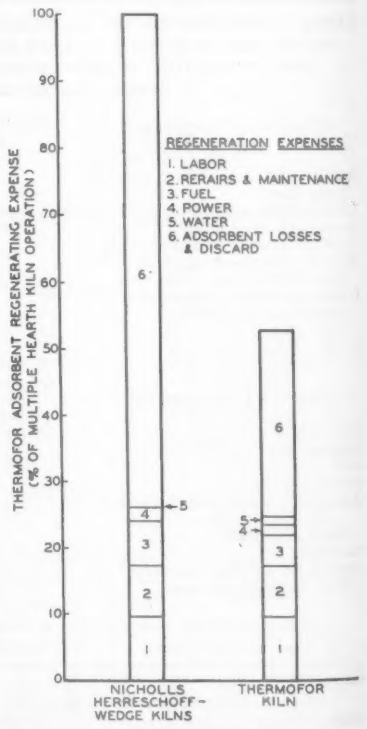

Fig. 2—Average cost comparison of Thermofor and multiple hearth clay regeneration expenses in a refinery processing Mid-Continent lubricating oils and waxes

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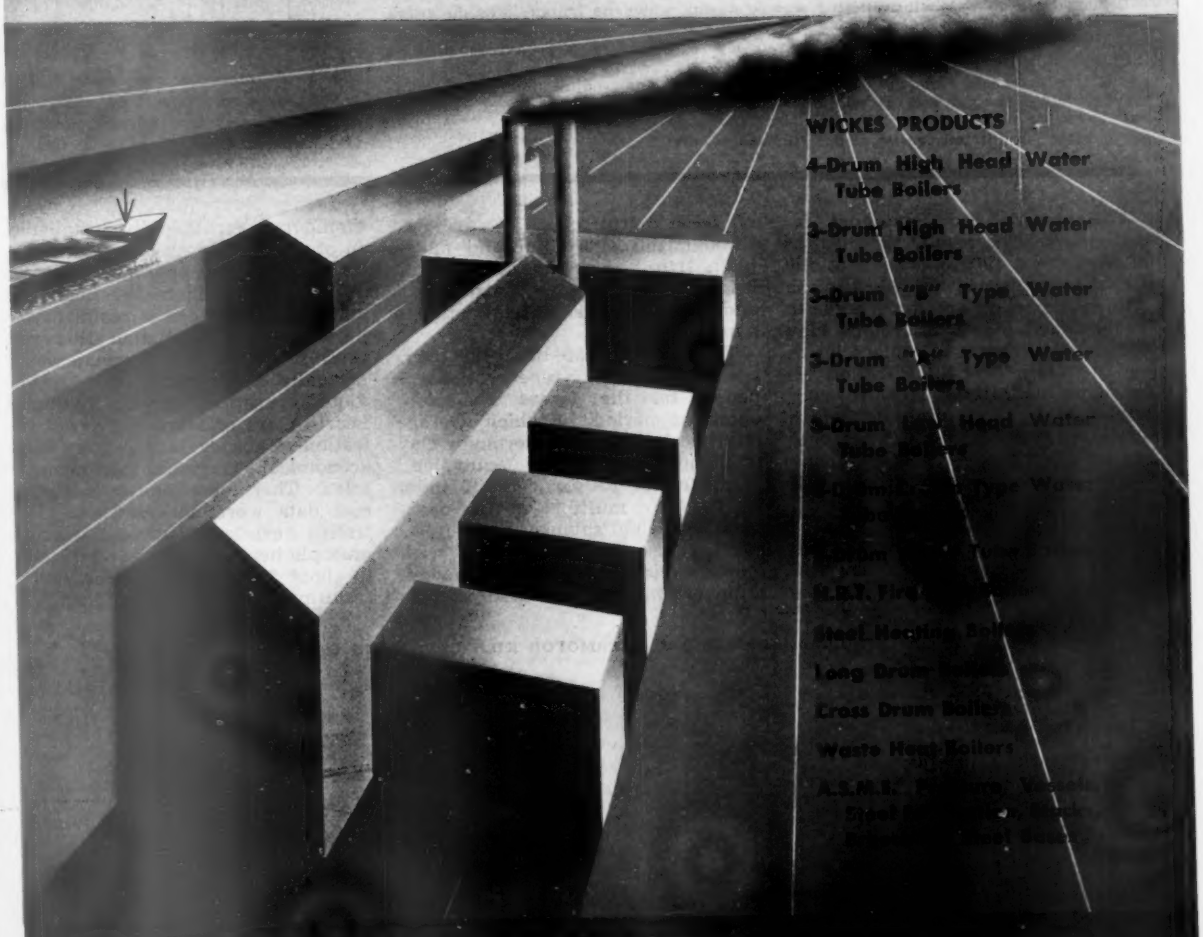

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TABLE 3—COMPARISON OF ADSORBENT REGENERATING EXPENSES IN A REFINERY PROCESSING MID-CONTINENT WAXES USING A THERMOFOR KILN AND DEELY-KENT RETORTS[1]
(Basis—1,000,000 Gal. of Wax Filtered)

Adsorbent Regeneration Equipment	Deely-Kent Retorts[2]	Thermofor Kiln[3]
Rated kiln capacity, tons/24-hour day	....	10
Kiln investment, dollars[4]	....	13,000
Adsorbent regenerated	Bone Char	Bauxite
Tons of adsorbent regenerated	677	204
Tons of adsorbent purchased/ton adsorbent regenerated	0.0240	0.0144
Gal. of wax filtered/ton adsorbent regenerated[5]	1,476	3,947

Adsorbent Regeneration Expenses	Thermofor Operating Expenses as Per Cent of Deely-Kent Retort Operating Expenses	Differences Between Thermofor and Retort Operation in $ / Million Gal. Wax Filtered
Labor	100	0
Repairs and maintenance	5.2	1,023
Fuel	38	537
Power	133.5	—91
Water	Air Cooled	—202
Adsorbent losses and discard	8.4	1,782
Total regeneration expenses	55.6	3,049
Savings[6]	44.4	3,049
Savings in $/year, operating at kiln capacity	....	54,500

1. Based on Queens refinery cost data for a 59-month operating period.

2. Char discarded when carbonaceous content reached 25 per cent. About 6 months to a year service.

3. Average of 59 months filtering service during which no bauxite was discarded, additions only replacing losses. About 350 regenerations.

4. Original investment adjusted to present levels by assuming a 25 per cent increase in material and a 40 per cent increase in labor costs.

5. It is estimated from the commercial data that the Thermofor unit will continue to regenerate the bauxite indefinitely without appreciable decreases in adsorbent efficiency.

6. Materials filtered consist of paraffin waxes only

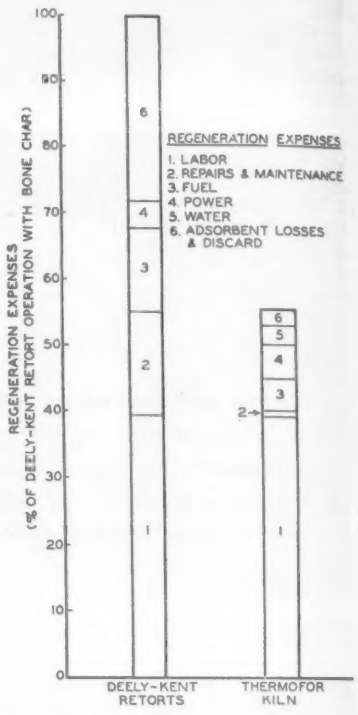

Fig. 3—Average cost comparison of Thermofor-bauxite and retort-bone char regeneration expenses in a refinery processing Mid-Continent waxes

2. Paulsboro and Beaumont installations.—The results of 50 months of Thermofor kiln operation at the Paulsboro refinery on 30-60 mesh Attapulgus clay are presented in Table 2 and Fig. 2. Estimated clay additions necessary to replace losses and maintain over-all filtration efficiency practically equal to that obtained by previous multiple hearth operation, were about 0.9 per cent of the absorbent processed during each regeneration cycle. The multiple hearth clays, formerly utilized, were discarded after 10 cycles of regeneration or 4 months service during which their efficiency decreased to about 50 per cent that of fresh burnt clay. Oils filtered through the Thermofor and multiple-hearth adsorbents consisted of bright stocks, neutrals, petrolatums, and waxes, both straight and in naphtha solution.

The data indicate that the average Paulsboro clay regeneration expenses for the 4-year Thermofor operating period, in which average multiple hearth and Thermofor clay efficiencies were equivalent, amounted to 53 per cent of those incurred by multiple hearth operation. Principal savings were effected in adsorbent purchases with minor savings in fuel and power. It is estimated that these savings would pay for the kiln installation in about 13 months of operation.

The savings in operating expenses by the same kiln in the Beaumont refinery indicated a 6-month payoff period on the installation. However, these savings are higher than would normally be expected because previous operation utilized multiple-hearth clays of a lower over-all filtration efficiency than is considered economical. Therefore, the comparative Thermofor - multiple hearth cost data were not used for illustrative purpose. Previous Beaumont multiple-hearth clays were subjected to about 25-28 regenerations with a resulting decrease in efficiency to

TABLE 4—COMMERCIAL THERMOFOR KILN OPERATING DATA

Refinery—	Atlas	Queens	Olean	Beaumont	Paulsboro*
Rated kiln capacity, tons/24-hour day	10	10	50	170	170
Kiln investment, dollars†	13,000	13,000	37,000	110,000	110,000
Adsorbent regenerated	bauxite	bauxite	fuller's earth	fuller's earth	fuller's earth
Materials filtered through adsorbent	waxes	waxes	oils, waxes	oils, waxes	oils, waxes
Labor, man hours/24-hour day	24	24	24	24	24
Fuel, thousands B.t.u./ton adsorbent regenerated	(‡)	3,545	(‡)	2,445	§673
Power, K.W.H./ton adsorbent regenerated¶	9.2	9.2	7	12.8	10.1
Water, gal./ton adsorbent regenerated	9600	(‡)	air cooled	(‡)	6,150
Repairs and maintenance, per cent of investment/year	5.6	1.7	‖11.8	4.2	‖15.5

*Paulsboro Thermofor kiln, although originally designed for the same capacity as the Beaumont unit, has been consistently regenerating fuller's earth at the rate of 216 tons/24-hour day by employing an auxiliary blower and heating the combustion air. †Original investment costs adjusted to present levels by assuming a 25 per cent increase in material and a 40 per cent increase in labor costs. ‡Data were not available. §A large proportion of Paulsboro spent clays contain inordinate amounts of carbonaceous material. Beaumont clays, however, contain smaller amounts than normally encountered. An average fuel value would be about 1,200,000 B.t.u./ton adsorbent. ¶Includes power for salt pump, air blowers, furnace circulating fan, and rotary screen. ‖Olean and Paulsboro units, being the first of their types, were subjected to experimentation and design changes thus increasing costs of repairs and maintenance.

15-25 per cent that of fresh burnt clay.

3. **Queens and Atlas kilns.**—The results of 59 months of bauxite regeneration in the Queens refinery are presented in Table 3 and Fig. 3. Comparable data were not available for the Atlas installation. During this period, the only adsorbent added to the system was that needed to replace losses; about 1.5 per cent of the processed bauxite. At the conclusion of the period the percolation efficiency of the bauxite for waxes was apparently unimpaired even though it had undergone about 350 successive regenerations. Variations in wax yield were dictated by refinery operating conditions rather than decrease in bauxite efficiency. These data were compared with those obtained from previous regeneration of bone char in Deely-Kent retorts.

The large average saving shown by the Thermofor-bauxite operation is higher than would be normally expected. In this connection, it should be remembered that both bone char as an adsorbent and retorts as a regenerative medium were notoriously inefficient. However, the savings in this installation indicate a kiln payoff period of about 3 months.

B—Basic Thermofor Kiln Operating Data

The commercial Thermofor kiln operating data summarized in Table 4 present the basic labor, repairs, and utility costs for each of the various refinery installations. It will be noted that each kiln, regardless of regenerating capacity, has been assigned the same operating manpower. In the small units, this factor amounts to about 70 per cent of the adsorbent regenerating expenses. Therefore, it appears that new kiln installations should, in so far as is practical, be equipped with sufficient automatic control and safety devices to minimize manpower requirements.

The wide variances in the utility requirements of the various units can probably be attributed to the differences in adsorbent employed and types of lubricants filtered through the adsorbents. Repairs, however, depend upon two factors: changes in the original kiln design, and subsequent conditions of kiln operation. The Olean and Paulsboro units, being the first of their types, were subjected to changes in design later incorporated into the other three units. These alterations resulted in abnormal repairs and maintenance costs for these two kilns.

TABLE 5—INVESTMENT IN THERMOFOR KILN INSTALLATIONS OF VARIOUS CAPACITIES

Refinery—	Paulsboro	Olean	Queens
Rated kiln capacity, tons/24-hour day	170	50	10
Cost of kiln installation, dollars	110,000	37,000	13,000
Kiln royalty, dollars	170,000	50,000	10,000
Total	280,000	87,000	23,000
Savings by Thermofor operation, $/year	*105,700	69,400	54,500
Payout period in years	2.64	1.25	0.42

*Although the Paulsboro kiln has a rated capacity of 170 tons/24-hour day, it has been consistently processing 216 tons/24-hour day. Savings are based upon the actual operating capacity.

William B. Hudson, Foster Wheeler Corp., was elected president of Junior Chemical Engineers of New York at the organization's annual meeting. **Maurice R. Lyons,** M. W. Kellogg Co., was chosen vice president; **Richard Rosencranz,** Shell Oil Co., Inc., secretary-treasurer; **Andrew A. Melnychuk,** Celanese Corp., assistant secretary.

N. O. Watson has resigned his position as general manager of the Caribbean Petroleum Co. He is succeeded by **J. H. Loudon.**

Harold Haight will arrive from Egypt around the first of September to begin his duties as Venezuelan production manager for Creole Petroleum Corp. with headquarters in Caracas.

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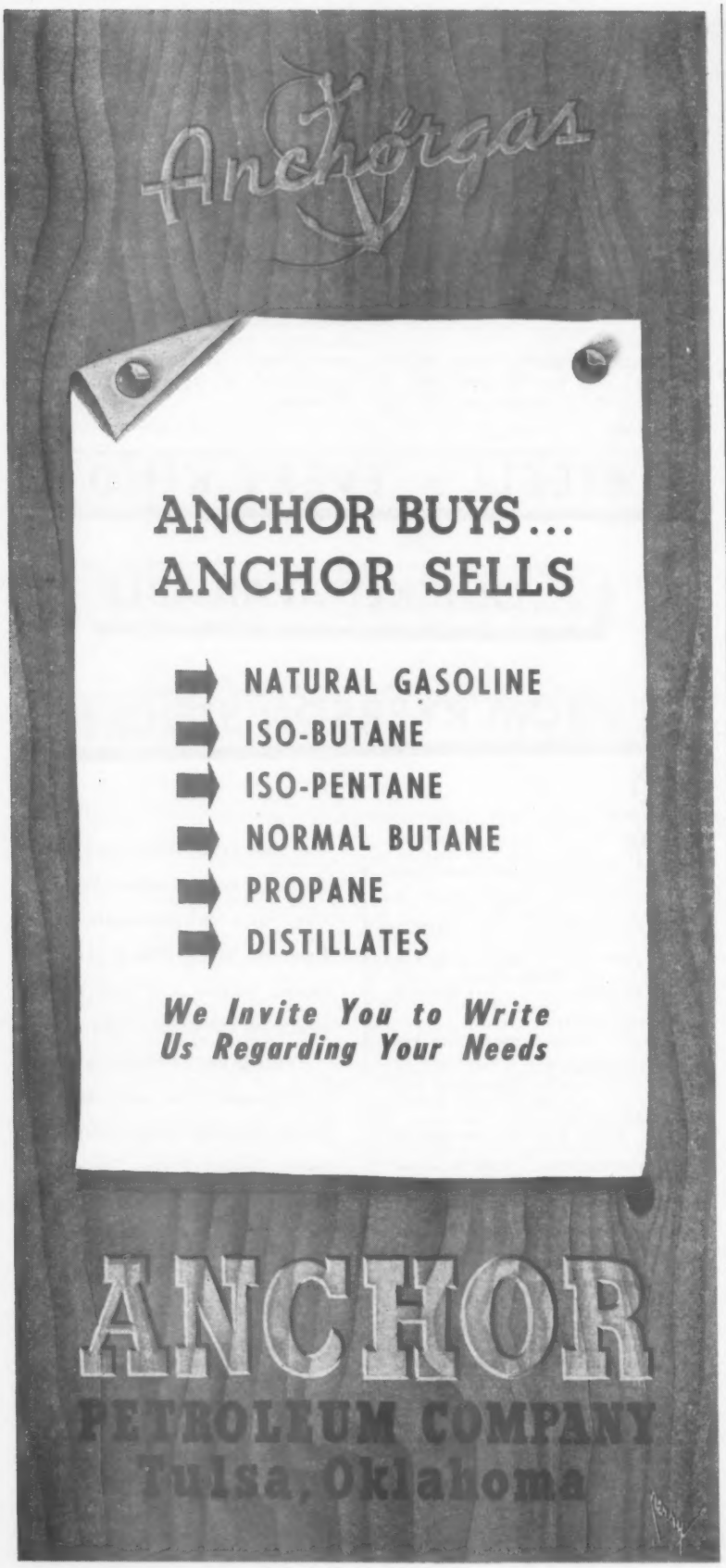

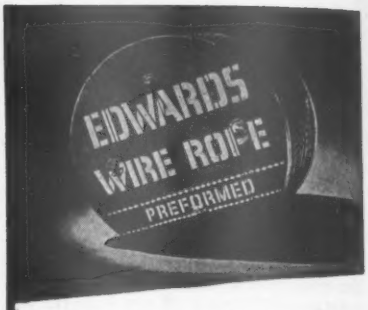

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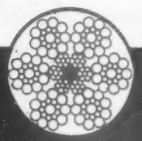

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Filtering Water Before Injecting Into An Oil Sand

THE filtering of water before injecting it into the oil sand is necessary in order to remove the smaller and lighter particles of floc that do not settle in the pits. Analysis of the suspended floc in the water shows that this material is made up largely of iron hydroxide coming from the solution of iron from the tanks, aluminum hydroxide originating from the aluminum sulfate used in treating the water, silica derived from dust particles drifting in from the air, and fine silt particles derived from oil sands, from concrete and cement used in making the settling pits, and from asbestos and cement pipes used in transporting water to the disposal pits. These fine colloidal sediments that do not settle out in the settling pits must be removed before the water goes into the intake well or they will soon clog up the sand in the ground and prevent salt-water disposal.

Description of filters.—The vertical steel tank type or "cheese box" rapid filters are used in most places to filter salt water (Fig. 1). These filters have a capacity of about 50 cu. ft. of sand per filter and are capable of handling 3,000 to 4,000 bbl. of water per filter. This volume amounts to about 2½ to 3 gal. per minute per square foot through 24 in. of sand. The filters are charged by placing 6 to 18 in. of gravel on the perforated openings on the bottom of the filter and then 24 in. of sized and screened sand above. The practice in the East Texas field is to make up the filter media as follows:

Thickness of layer—	Size of sand and pebble used (in.)
24-in. sand	0.0165-0.0331*
2-in. fine gravel	0.1875-0.5000
5-in. gravel	0.5000-0.5625
3-in. gravel	0.5625-0.8125
4-in. coarse gravel	0.8125-1.6250

*At least 75 per cent of the sand falls between these sizes and will pass a No. 20 screen and be caught on a No. 40 screen.

PARTIAL ANALYSIS OF FLOC IN EAST TEXAS SALT-WATER DISPOSAL SYSTEMS IN PER CENT BY WEIGHT

Compound—	Sample numbers (1)	(2)	(3)	(4)
$CaCO_3$	16.1	62.7	3.7	8.1
FeS	24.3	5.8	9.3	25.1
$MgCO_3$	0.26	0.87	0.9	0.21
AL_2O_3	15.3	8.9	4.3	10.6
SiO_2	13.3	4.6	47.4	22.6

The gravel layers are used to keep the finer sand above from getting down through the water flow lines into the pump and intake well. The sand layers do the filtering, and most of the insoluble material in the water is removed in the upper ¼ in. of the filter sand. A few operators use aloxite plate in place of the layers of gravel. Aloxite is a patented permeable plate 3 in. thick made by partially fusing granules of aluminum oxide together in an electric furnace. It is important that the filter sand be carefully selected and accurately screened. The U. S. Bureau of Mines after extensive investigation found that sand grains having an effective size* of 0.59 mm. and a

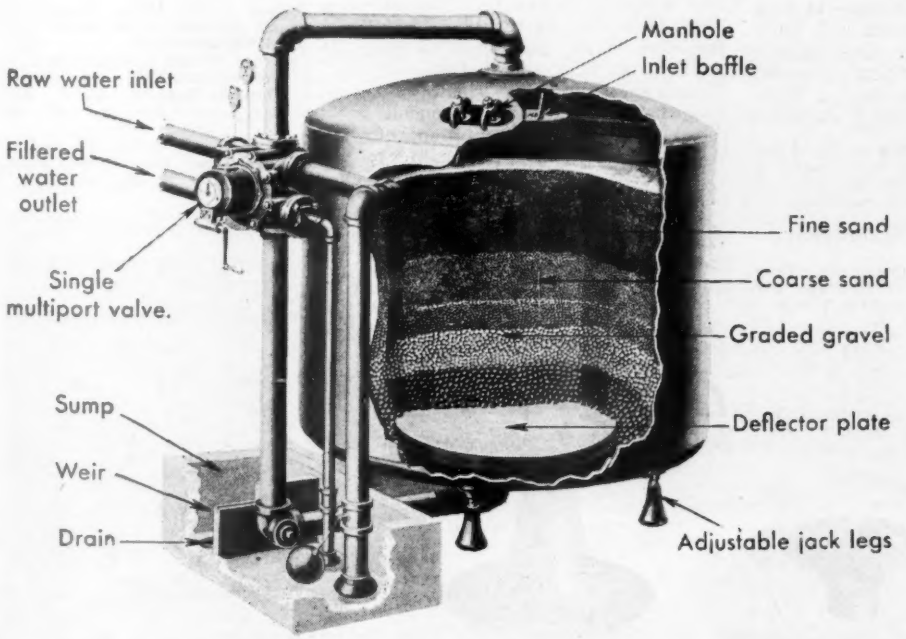

Fig. 1—Cutaway of a pressure filter. Raw water enters at top, passes down through fine and coarse sand, then gravel. To clean filter by back washing, water is flowed up from the bottom

*The method of determining the effective size of sand grains is as follows: Make a screen analysis of the dry sand, weighing amounts retained on the screens. Draw a cumulative percentage curve by plotting on semilog paper the accumulative percentages of the sand against the size of the screen openings in millimeters. The intersection of the curve with the 90 per cent line gives the effective size.

Series prepared by F. B. Plummer, professor, petroleum engineering school, University of Texas

uniformity coefficient† ratio of 1.79 gave best results in an experimental filter. Specifications for filter sand for city water supplies recommend an effective size of between 0.55 mm. and 0.60 mm. and a uniformity coefficient of not more than 1.8. Also the grains must be of hard materials, so that they will not disintegrate in back washing, entirely free of clay, dust, and organic matter, containing not more than 2 per cent of calcium and magnesium carbonate, and not less than 1 per cent of grains may be less than 0.3 mm. in diameter, and at least 70 per cent of the grains should have diameters less than 0.30 mm., and no grains should have diameters larger than 3 mm.

Choice of filter media.—Several products have been tried out for filtering salt water, namely, aloxite granules, anthracite granules, graphite ore particles, dolomite granules, river sand, ocean beach sand, and Carrizo sand from the outcrop in East Texas. Whichever type of particles is selected the grains are passed through a screen of correct size and washed before using. In the past, river sands have been most used. River filter sand is generally cheapest and easiest to procure. Recently, anthracite particles and graphite ore have been tried out successfully in East Texas and other fields and have proved to have some advantages.

When alkaline or neutral water goes through silica sand a little silica dissolves forming colloidal silicic acid so that if pure distilled water is run through a filter without back washing the permeability of the sand drops and in a surprisingly short time. Commonly in only a few weeks the sand becomes clogged. Some of the colloidal silica passes through the filter and may enter the sand in the intake well tending to reduce the permeability of the sand in the well. Probably some colloidal silica is formed in the underground sand itself, so that this silica effect cannot be eliminated altogether.

Analysis of filtered water from different types of filter media, however, show that water from sand filters contain more silica than water from anthracite or graphite ore filters. Finally sand filters after long periods of constant use in filtering salt water tend to become cemented by iron and calcium carbonate. The cementation takes place first around the edge of the sand next to the walls of the tank and then toward the interior forming small and large nodules and balls of consolidated sand. This cementation, of course, reduces the permeability of the filter and the filter sand has to be replaced with new sand. Experiments carried on through a 12-month period in our laboratory indicate that anthracite and graphite ore filter particles do not become cemented together so quickly as sand grains.

In fact, in all tests the silica sand filters failed before those with non-silica sand. The reason for this difference is not known. It has been suggested, however, that cementation is an electrical phenomenon, that iron and calcium are deposited at cathodic spots due to electrical currents set up in the sand bed and that the electrical properties of anthracite and graphite are quite different from those of silica sand. It may be due, however, to the fact that river sand contains originally more calcareous and more ferruginous material than does anthracite or graphite.

COMPARISON OF PHYSICAL PROPERTIES OF FILTER MEDIA USED IN SALT-WATER DISPOSAL SYSTEMS

Sample No.	Mineral—	Specific gravity	Hardness	Effective size in mm.	Uniformity coefficient
1	Graphite ore*	2.29	5	0.68	1.0
2	Anthracite	1.5	2	0.64	1.0
3	Terrace sand from Texarkana	2.65	6	0.30	2.4
4	Filter sand from Minnesota	2.65	6	0.42	1.7

*The graphite ore is black, resembling black slate, and has a compressive strength of 9,515 psi. on 2 by 2 by 2-in. cubes.

†The size corresponding to the 40 per cent value is read from the cumulative curve and this divided by the effective size gives the uniformity coefficient:

$$\frac{D' 40}{D' 90} = \text{uniformity coefficient}$$

The smaller the coefficient the more uniform the sand. Where all grains are the same size the coefficient is 1.00.

Fig. 2—"Umbrella" strainers which serve as collecting and distributing nozzles in some filters

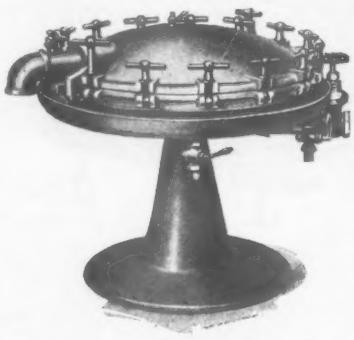

Fig. 3—One type of disk filter. Utilizes a circular permeable disk for filtration action

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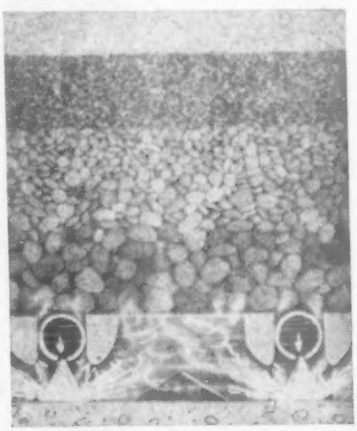

Fig. 4—Movement of back-wash water is evenly distributed throughout area of filter bed by this type of distribution system

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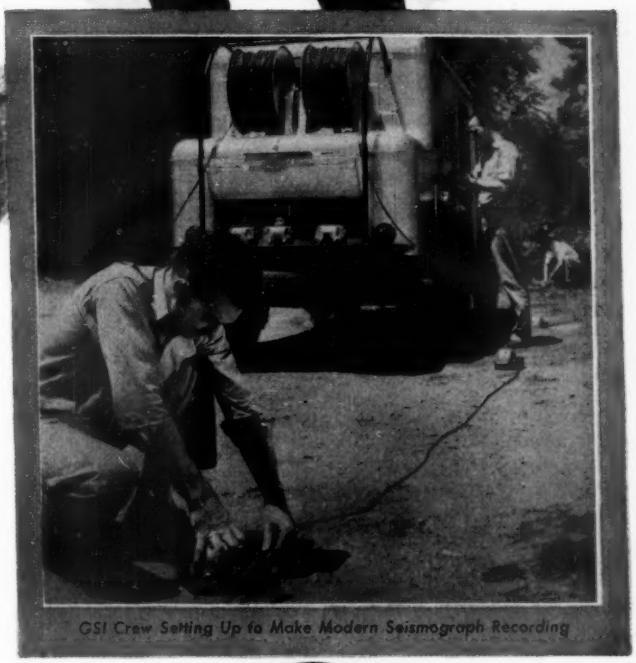

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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Self-Supporting Foundations For Towers and Stacks

FOUNDATIONS for vertical towers must be designed for the overturning effect of the wind as well as the direct weight of the tower. The method outlined here may be used to approximate the amount of concrete and the diameter necessary for round foundation.

Allowable soil-bearing pressures vary widely, but in general:

	Lb. per sq. ft.
Rock	30,000
Weak rock	10,000-20,000
Gravel and sand, compact	16,000-20,000
Dry thick clay or compact well-cemented sand	8,000-12,000
Dry sand, or thick somewhat dry clay	4,000- 8,000
Soft clay	2,000- 4,000
Thick alluvial soil or quicksand	1,000- 2,000

The maximum wind velocities and pressures caused by them are somewhat as follows:

	M.p.h.	Lb./sq. ft.
Mild winds	50	12
Southwest	70	22
Coasts	100	45

Tables 1, 2, and 3 show useful constants for round foundations and Fig. 1 shows the dimensions and symbols in the computations.

- S wind load, lb./sq. ft.
- d diameter of tower, ft.
- H height, ft.
- D diameter of foundation, ft.
- W weight of tower full of water and foundation, lb.
- w weight of tower and foundation, lb.
- A area of foundation, ft.
- M wind moment, ft. lb.

TABLE 1—3-FT.-6-IN. THICKNESS—CONSTANTS FOR ROUND CONCRETE FOUNDATIONS

Diameter (ft.)	D^2	Area (sq. ft.)	Wt. (lb.)	Cu. yd. of concrete
6′-0″	216	28.27	14,900	3.6
6′-6″	275	34.21	17,900	4.4
7′-0″	343	38.49	20,200	5.0
7′-6″	422	44.18	23,200	5.7
8′-0″	512	50.27	26,400	6.6
8′-6″	614	56.74	29,800	7.3
9′-0″	729	63.62	33,400	8.2
9′-6″	857	70.88	37,200	9.1
10′-0″	1,000	78.54	42,200	10.1
10′-6″	1,158	86.59	45,500	11.2
11′-0″	1,331	95.03	49,900	12.3
11′-6″	1,521	103.87	54,500	13.4
12′-0″	1,728	113.10	59,400	14.6

TABLE 2—4-FT. THICKNESS—CONSTANTS FOR ROUND CONCRETE FOUNDATIONS

Diameter (ft.)	D^2	Area (sq. ft.)	Wt. (lb.)	Cu. yd. of concrete
8′-0″	512	50.27	30,200	7.5
8′-6″	614	56.75	34,000	8.3
9′-0″	729	63.62	38,200	9.4
9′-6″	851	70.88	42,500	10.4
10′-0″	1,000	78.54	47,100	11.6
10′-6″	1,158	86.59	52,000	12.8
11′-0″	1,331	95.03	57,000	14.0
11′-6″	1,521	103.87	62,300	15.3
12′-0″	1,728	113.10	67,900	16.7
12′-6″	1,953	122.72	73,600	18.1
13′-0″	2,197	132.73	79,600	19.6
13′-6″	2,460	143.14	85,900	21.2
14′-0″	2,744	153.94	92,400	22.8
14′-6″	3,049	165.13	99,100	24.4
15′-0″	3,375	176.71	106,000	26.1
15′-6″	3,724	188.69	113,200	27.9
16′-0″	4,096	201.06	120,700	29.8
16′-6″	4,492	213.82	128,300	31.6
17′-0″	4,913	226.98	136,200	33.6
17′-6″	5,359	240.53	144,300	35.6
18′-0″	5,832	254.47	152,700	37.7
18′-6″	6,332	268.80	161,300	39.8
19′-0″	6,959	283.53	170,100	42.0
19′-6″	7,415	298.65	179,200	44.2
20′-0″	8,000	314.16	188,500	46.5
20′-6″	8,615	330.06	198,000	48.9
21′-0″	9,261	346.36	208,000	51.3
21′-6″	9,938	363.05	218,000	53.9
22′-0″	10,648	380.13	228,000	56.2

TABLE 3—5-FT. THICKNESS—CONSTANTS FOR ROUND CONCRETE FOUNDATIONS

Diameter (ft.)	D^2	Area (sq. ft.)	Wt. (lb.)	Cu. yd. of concrete
17′-0″	4,913	226.98	170,000	42.0
17′-6″	5,359	240.53	181,000	44.5
18′-0″	5,832	254.47	191,000	47.1
18′-6″	6,332	268.84	202,000	49.8
19′-0″	6,959	283.53	212,000	52.5
19′-6″	7,415	298.65	224,000	55.2
20′-0″	8,000	314.16	236,000	58.0
20′-6″	8,615	330.06	247,500	61.1
21′-0″	9,261	346.36	259,800	64.1
21′-6″	9,938	363.05	272,300	67.4
22′-0″	10,648	380.13	285,100	70.3
22′-6″	11,391	397.61	298,200	73.6
23′-0″	12,167	415.48	311,600	76.9
23′-6″	12,978	433.74	325,300	80.3
24′-0″	13,824	452.39	339,300	83.7
24′-6″	14,806	471.43	353,600	87.3

There are two generally dangerous situations. When the tower is full of water for test purposes, the great weight of the tower plus the pressure caused by the wind will produce a bearing pressure too great for the soil. The other condition arises when the tower is empty. During a strong wind the tower (and concrete) does not weigh enough to keep one side of the foundation from lifting, and the tower falls over. Both of these conditions must be checked as in the procedure and illustration given below.

Procedure

(1) **Select wind velocity** and determine wind moment.

$$M = SdH\left(\frac{H}{2} + 2\right)$$

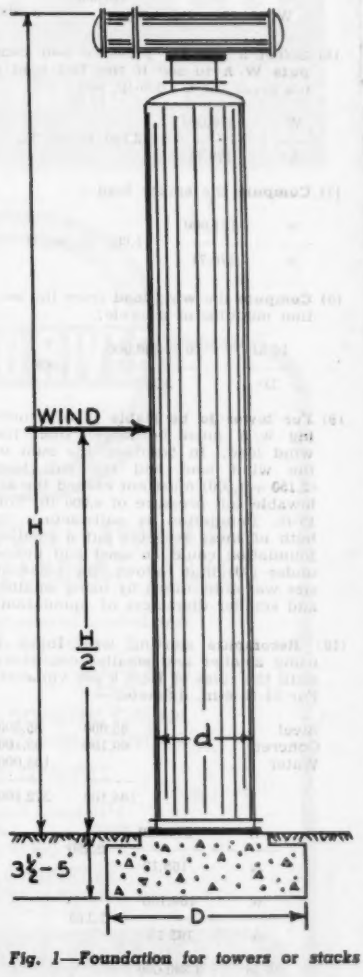


Fig. 1—Foundation for towers or stacks

No. 53 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

The Refiner's Notebook (Continued)

For 70-mile wind, 8-ft. diameter tower of height 60 ft.—

$$M = 22 \times 8 \times 60\ (32) = 338{,}000$$

(2) **Estimate weight of steel** (see Notebook No. 49, July 7, 1945). For a ½-in. shell the weight is about 85,000 lb.

(3) **Estimate weight of water** in tower when full.

$$60 \times 8^2 \times \frac{3.1416}{4.0} \times 62.4 = 188{,}000$$

(4) **Assume diameter** of foundation. We shall try 15-ft. diameter and a 4-ft. thickness. Table 2 shows:

Weight	106,000
Area	176.71
Diameter cubed	3,375

(5) **Weight of empty and of full tower.**

Steel	85,000	85,000
Concrete	106,000	106,000
Water	.....	188,000
w	191,000	
W		379,000

(6) **Select a bearing pressure and compute W/A** to see if the full load is too great for a 4,000-lb. soil:

$$\frac{W}{A} = \frac{379{,}000}{176.71} = 2{,}150 \text{ lb./sq. ft.}$$

(7) **Compute the empty load—**

$$\frac{w}{A} = \frac{191{,}000}{176.71} = 1{,}081 \text{ lb./sq. ft.}$$

(8) **Compute the wind load** from the section modulus of a circle:

$$\frac{10\,M}{D^3} = \frac{10 \times 338{,}000}{3{,}375} = 1{,}000$$

(9) **For tower to be stable** to overturning w/A must be larger than the wind load. In addition, the sum of the wind load and the full load (2,150 + 1,000) must not exceed the allowable soil pressure of 4,000 lb. The 15-ft. foundation is satisfactory in both of these respects but a smaller foundation could be used and hence under (10) that follows, the smallest size was determined by using smaller and smaller diameters of foundation.

(10) **Recompute** starting with Items 4 using smaller and smaller diameters until the rules of Item 9 are violated. For 14-ft.-6-in. diameter—

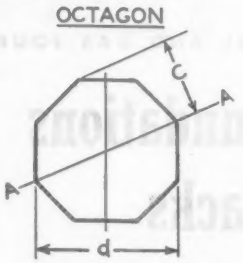
Steel	85,000	85,000
Concrete	99,100	99,100
Water	.....	188,000
	184,100	372,100

$$\frac{W}{A} = \frac{372{,}100}{165.13} = 2{,}250$$

$$\frac{w}{A} = \frac{184{,}100}{165.13} = 1{,}115$$

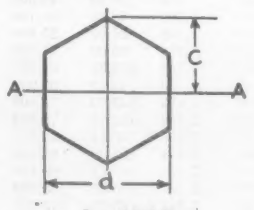
$$\frac{10\,M}{D^3} = \frac{3{,}380{,}000}{3{,}049} = 1{,}105$$

OCTAGON



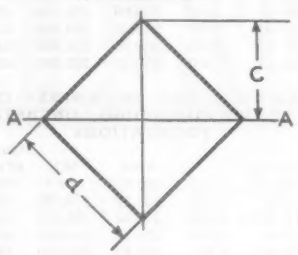
$A = 0.828d^2$
$C = 0.541d$
$I = 0.055d^4$
$Z = 0.1016d^3$
$r = 0.257d$

HEXAGON



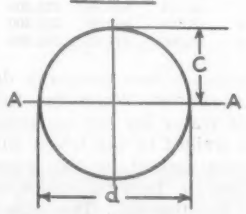
$A = 0.866d^2$
$C = 0.577d$
$I = 0.06d^4$
$Z = 0.104d^3$
$r = 0.264d$

SQUARE



$A = d^2$
$C = 0.707d$
$I = d^4/12$
$Z = 0.118d^3$
$r = 0.289d$

CIRCLE



$A = 0.7854d^2$
$C = d/2$
$I = 0.049d^4$
$Z = 0.098d^3$
$r = d/4$

$$\frac{W}{A} + \frac{10\,M}{D^3} = 3{,}350$$

A 14-ft.-6-in. foundation is satisfactory because the maximum soil load is only 3,350 lb. per sq. ft. and the empty load is greater or about equal to the wind load (1,115 exceeds 1,105). A smaller foundation would result in too great bearing pressures and would tend to overturn. According to Table 2 the foundation will require 24.4 cu. yd. of concrete.

Steel stacks (unguyed).—Stack foundations can be designed in the same manner using Tables 1, 2, and 3 but since the stack is never filled with water the condition of overturning is always the troublesome one. For this reason thinner but larger-diameter foundations are usually employed and more steel reinforcement is used than in tower foundations.

Illustration — A 15-ft.-diameter 100-ft. stack weighs 17,000 lb. At a wind velocity of 70 m.p.h. the wind moment is:

$$M = 5 \times 52 \times 22 \times 100 = 570{,}000$$

Try a 20-ft.-6-in. foundation—

Weight of steel	17,000
Weight of concrete	198,000
	215,000

$$\frac{w}{A} = \frac{215{,}000}{330.06} = 651 \text{ lb.}$$

$$\frac{10\,M}{D^3} = \frac{5{,}700{,}000}{8{,}615} = 661 \text{ lb.}$$

$$\frac{w}{A} + \frac{10\,M}{D^3} = 1{,}312 \text{ lb.}$$

The value of w/A should be greater than the wind load of 661 lb. and hence a slightly larger foundation is required. Foundations for stacks are so large and expensive that guy wires are usually employed.

Anchor bolts.—The maximum load on each bolt in pounds may be computed from—

$$S_B = \frac{4\,M}{ND_B} - \frac{w}{N}$$

in which N is the number of bolts and D_B is the diameter of the bolt circle in feet. The diameter of the bolts usually ranges from 1 to 2 in. and the allowable stress should be between 12,000 and 15,000 psi. An allowance of $\frac{1}{16}$ in. for corrosion may be made and no harm is done by putting the bolts in stress (up to S_B) by tightening them. E. F. Brummerstedt in Technical Section, National Petroleum News, January 5, 1944, shows that the above equation is not theoretically sound but it is easy to apply and yields conservative answers.

Design Computations

In actual design computations more exact methods should be employed and other shapes of foundation such as square, hexagonal, or octagonal may be advisable. The geometric elements of various shapes of bases are shown in Fig. 2.

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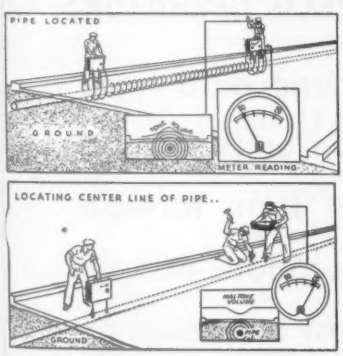

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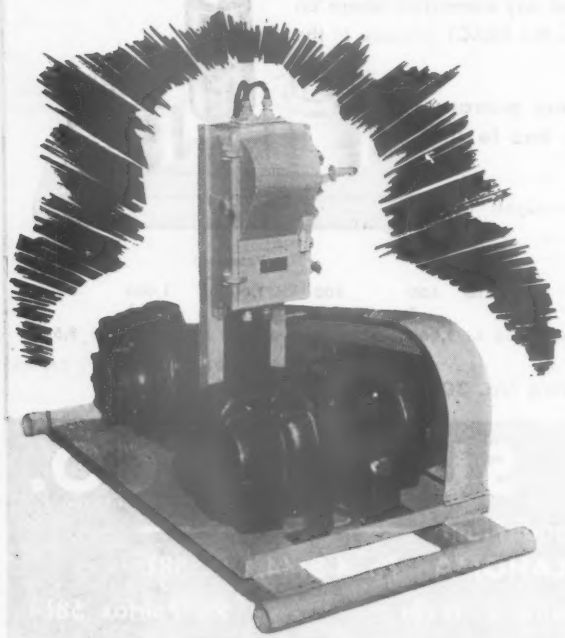

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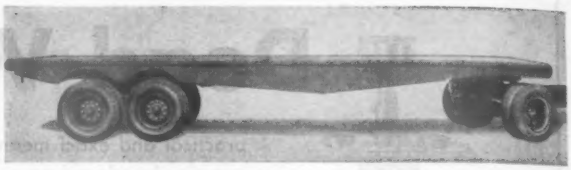
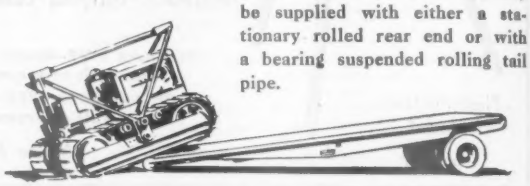


The Tandem Machinery Trailer

Nabors Self-Loading Platform Trailers, both single and tandem axle models, are designed expressly to withstand the severe use and abuse of heavy machinery and equipment haulers. Illustrated below is one method of loading heavy equipment on these trailers. Machinery Trailers are furnished with rolled front end with built-in lift hook and may be supplied with either a stationary rolled rear end or with a bearing suspended rolling tail pipe.



NABORS TRAILERS

W. C. NABORS COMPANY, MANSFIELD, LOUISIANA

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EXPERIENCED OPERATORS

of sulphuric acid type alkylation units wanted for short term foreign work. Location: Middle East. Must be prepared to leave immediately. Salary arranged.

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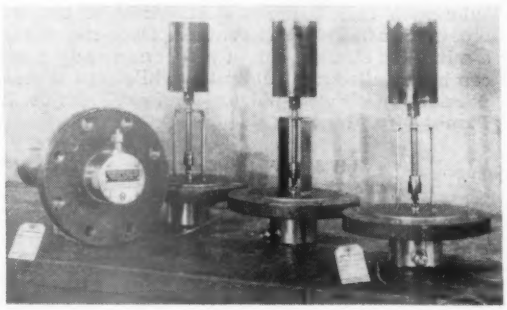
BOSTON, MASS.

OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

by Kenneth B. Barnes

(1) CORROSION - RESISTANT LIQUID LEVEL controllers are now available in which parts contacting liquid are made of Hastelloy B. This new method for liquid level control is straightforward and simple. Float motion is transmitted through the walls by means of a flattened flexible member similar to a Bourdon tube. The packless flexible shaft eliminates all linkage, internal bearings, rubbing parts, stuffing glands. Sensitivity is such that a buoyancy change of less than 6 oz. will result in full travel of the diaphragm control valve. Because of the high sensitivity of the controller, it is well adapted for the control of the interface level of two immiscible liquids having a specific gravity difference as small as 0.05, maintaining the level of the heavier liquid at a predetermined point. *Moore Products Co.*

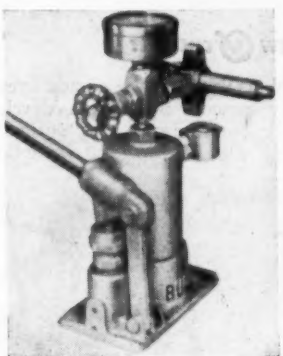


IT'S NEW ✓ CHECK IT

(2) STAINLESS TRIM GATE VALVES are now available, following service experience in plants handling butadiene, styrene, and various sour stocks. Quick-acting, the gate valve has a special stem-and-nut design, in which the disk rises with the stem as the stem rises in the nut, thus accomplishing full opening and closing in half the turns usually required. The 4-in. size has steel body, either brass or 18-8 stainless-steel trim. The stainless trim includes stem, stem nut, disks, bonnet nut, and all moving or threaded parts. Valve seats furnished are inserted steel rings faced with Hastelloy B. The 6-in. valve has either steel or iron body, with the steel body of brass or stainless trim. *Shand & Jurs Co.*

IT'S NEW ✓ CHECK IT

(3) PORTABLE NOZZLE AND INJECTOR TESTER is designed for use with all popular makes of diesels. Technical knowledge is not required to operate the tester, and any mechanic or diesel operator can measure injector opening pressures with it, determine accurate adjustment, check spray pattern for uniformity, detect other irregularities such as sticking needle valve, dribble and leakage around valve seats. Equipped with standard 3,000-psi. hydraulic pressure gage. Weighs 19 lb., including steel carrying case, one adaptor and removable 12-in. steel handle. *The Buda Co.*



IT'S NEW ✓ CHECK IT

(4) TEMPERATURE EXCHANGER. For use on air and gas lines, and offering as a byproduct, external heating applications and positive purification by centrifugal action, the new temperature exchanger features a multiple-action helicoid flighting. This unit, as an after-cooler, is recommended for installation at compressor discharge point. Velocity of the medium (air or gas) under pressure resolves the helicoid flighting at high speeds, forcing the air or gas outward against the internal cooling fins. The internal fins rapidly absorb the heat and dissipate it to the external fins, thereby lowering the medium to room temperature in the length of the unit. By the cooling action, vaporized moisture and oil suspended in the medium

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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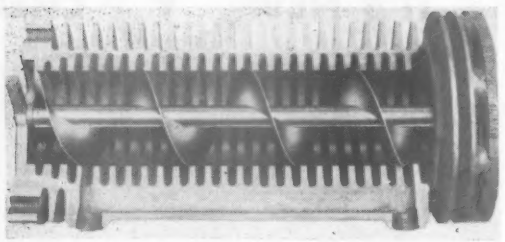


condenses and is entrained in the sump, assuring a moisture-free, cooled medium at the discharge point. Parallel assemblies may be made, as well as tandem installations. In addition to its effectiveness in temperature control, there are money-saving advantages in the utilization of the heat given off by the external cooling fins. *Bird-White Co.*

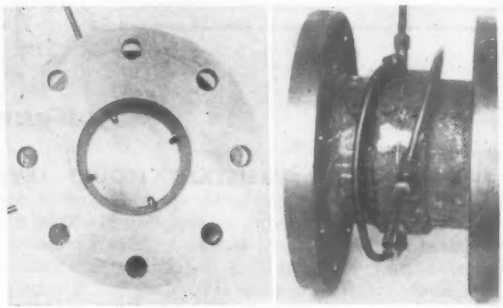
IT'S NEW CHECK IT

(5) POWER-DRIVEN TONGS make up and break out tubing joints by power. Swung in derrick similarly to a rotary tong. Jaws automatically lock around tubing (2, 2½, 3-in.) Rotative action

from pneumatic motor through two-speed mechanism and split-type ring gear. Gives uniform makeup through controlled torque. Less fatigue on crews, faster. Economical, safe. *Hillman-Kelley.*

IT'S NEW CHECK IT

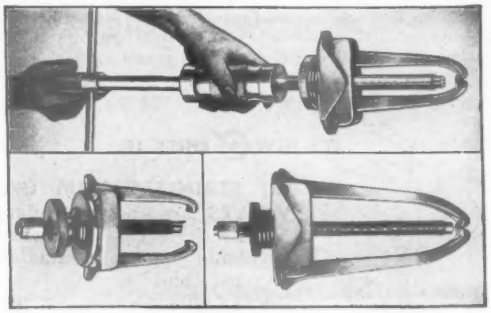
(6) GENTILE FLOW TUBE is a new primary element for metering fluids that uses the average velocity adjacent to the wall. Consists of a short pipe, on the inner periphery of which are mounted two groups of pressure nozzles, one group pointing upstream and the other downstream. The groups are interconnected by common pressure rings leading to a recording meter. While it is well known that the velocity right at the wall of a pipe is zero for either laminar or turbulent flow, the velocity gradient at the wall for turbulent flow is so steep that the velocity shortly outward jumps almost abruptly to approximately 75 per cent of the average. The flow tube, therefore, provides a differential, which will vary from one to two average velocity heads through the flow tube. This is more than twice that obtained in a venturi of corresponding size, and it is this circumstance which makes it possible to use a flow



tube with only a moderate contraction and still obtain measurable differentials. Does not require a minimum straight run of pipe, and nozzle groups can be installed and calibrated while pipe is under pressure. *Coldwell-Wilcox Division Krajewski-Pesant Mfg. Corp.*

IT'S NEW CHECK IT

(7) GEAR PULLERS IN MATCHED SETS. In every phase of maintenance the right type and size tool can make significant savings in job time. Pulling operations are no exception and the "Snap-On" matched gear pulleys provide tools to cover a wide range of pulling utility. The three sizes have maximum jaw capacities of 4½, 8½, and 14-in. In addition the small and medium sizes are available in slide-hammer design, or they can be furnished with all parts necessary for use as either standard or booster hammer pullers, pro-



viding perfect adaptability of the puller to the characteristics of each pulling job. Long jaws allow use of the puller where the shaft extends some distance through the gear or other part to be removed, are slenderized to permit work in close places. On the slide hammer-type pullers the centralized, guided shock of the booster hammer, combined with the screw tension, provides good pulling force and distributes the pull equally, to remove the part safely and quickly. *Snap-On Tools Corp.*

IT'S NEW CHECK IT

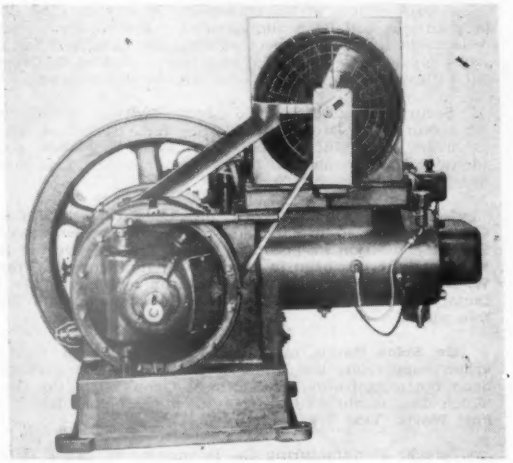
(8) FLUORESCENT LIGHTING SYSTEMS now make possible the daylight quality of fluorescent lights for drilling rigs, pipe-line construction, outdoor refinery and gasoline-plant operation, from either a.c. or d.c. current. Gives maxi-

mum light with minimum glare. Economical in first cost, installation and operation. For one installation example, on a power drilling rig the system consists of three light strings, one for derrick lighting, one for the floor, one for the mud

pumps and engines. The fluorescent fixtures are set in all-steel, waterproof boxes. Tube sockets and caps are water and shockproof. All strings are equipped with safety twist locks. *Wire Processing Co.*

IT'S NEW CHECK IT

(9) GAS-GASOLINE PUMPING ENGINE is introduced in a new line for pumping service. Features include a removable wet cylinder liner to eliminate reboring, steam cooling with water-level control (radiator cannot prime), Twin-Disc power takeoff, full-pressure lubrication. The lubri-



cated valve mechanism is fully enclosed, positively operated. Model CSCO-66 is rated 13.2 hp. at 680 r.p.m., is 5¾ by 7½ in., has a WR^2 of 600 lb. per sq. ft. There is wrenchless access to crankcase for removal of piston, and taking off one nut exposes valves. A 3-in. crankshaft and four-bolt connecting rod are used. *Continental Supply Co.*

IT'S NEW CHECK IT

(10) "SLIM HOLE" SUBMERGIBLE ELECTRIC PUMP is new model for use in 4½-in. o.d. (11 lb. per ft.) or larger casing. This new unit, like the larger sizes, uses electric power applied at the pumping level in the well. A submergible electric motor is direct-connected to a centrifugal pump in a single assembly on the tubing and submerged below the fluid level in the well. The pump will lift crude oil, fresh water, or brine, may be run in crooked holes, can be made fully automatic in operation, and permits use of small tubing which may be protected against corrosion when desired. Complete installation includes motor, protector, pump, cable, starting switch, and a full string of tubing of the size required for tensile strength and good flow efficiency. Capacity range of the Series 375 pump is between 35 bbl. per day with 500 to 9,000-ft. lift and 500 bbl. per day with 500 to 3,000-ft. lift. Horsepower range is ¾ to 21 hp. *Reda Pump Co.*

TRADE LITERATURE

(11) PIPE-CLEANING SERVICE. New and complete service cleans lines from 2 to 72 in. by use of "flexible" power drive and tools. Service is described in six-page folder which illustrates method and tools. Highly illustrated. Fully equipped service trucks maintained at strategic locations throughout the country. Ten-year cost data and performance records furnished on application. *Flexible Sewer-Rod Equipment Co.*

IT'S NEW CHECK IT

(12) HYDRAULIC OIL-PUMPING SERVICE MANUAL. Spiral bound, made to withstand hard usage, this 37-page service manual describes various types and designs of Triplex pumps. Contains engineering drawings, specifications, capacities, and check data. Book also carries general operating instructions and "exploded" pictures to aid in ordering parts for replacement. *Kobe, Inc.*

IT'S NEW CHECK IT

(13) INTRODUCTION TO ELECTRONICS. A 20-page, letterhead-sized folder punched to fit a ring binder, written to provide an understanding of the principles of electronics and the part electronics will play in future industrial developments. Illustrated with line drawings, curves, and sketches. *Allis-Chalmers Mfg. Co.*

IT'S NEW CHECK IT

(14) WIRE-ROPE CATALOG. A 48-page, spiral-bound catalog on wire rope designed and manufactured especially for the oil and gas fields. Describes a complete line, shows the construction of each type, has cross sections of each rope along with tables giving rope diameter in inches as well as breaking strength and approximate weight in pounds. Contains instructions for uncoiling, binding, socketing, field care, etc. Catalog is indexed. *A. Leschen & Sons Rope Co.*

IT'S NEW CHECK IT

(15) MATERIAL SAMPLE FOLDER. New, enlarged folder contains 52 actual samples of gasket and packing materials. Each described in detail with recommendations for its use. Technical data as to thickness and finish, etc., also given. Folder contains material for anything in the packing and gasket line from the smallest washer to the largest diesel engine head gasket. *Felt Products Mfg. Co.*

IT'S NEW CHECK IT

XUM

(16) FIRE-EXTINGUISHER FOLDER. Designed to fit all standard files, this folder carries information pertaining to fire extinguishers. Material printed on inside of folder includes sketches of the five principal types of fire extinguishers, classes of fire for which each is recommended, other data on the operation, recharging and effectiveness of extinguishers. *General Detroit Corp.*

IT'S NEW ✓ CHECK IT

(17) LIQUID ENVELOPE, a peelable plastic coating offered for protection of equipment being shipped for export, or for protecting plants or equipment installed along the seashore and subjected to corrosion or damage by exposure to the elements. Has been widely used as protective coating upon warplanes while en route overseas on open ships. Believed to have application in oil industry. A 16-page attractively illustrated booklet is available for distribution. *Better Finishes & Coatings, Inc.*

IT'S NEW ✓ CHECK IT

(18) ELECTRIC MOTORS AND TRANSFORMERS. A 16-page catalog punched to fit ring binders, describing an entire line of electrical and automotive products. Attractively printed in three colors, bulletin pictures and describes each product. *Wagner Electric Corp.*

IT'S NEW ✓ CHECK IT

(19) MINERAL WOOL INSULATIONS. New, 28-page industrial catalog describing in detail high and low-temperature mineral-wool insulations. Fully illustrated. Has complete application specifications, conductivity curves and engineering data. *Baldwin-Hill Co.*

IT'S NEW ✓ CHECK IT

(20) ELECTRODE REFERENCE CHART. A completely new and simplified chart on high and low-alloy welding electrodes. Data grouped for quick, easy use: includes weld metal chemical analyses, information on corrosion resistance, heat resistance, and weld metal surfacing. Also includes welding currents and voltages and stub end color table. *Arcos Corp.*

IT'S NEW ✓ CHECK IT

(21) APPLICATION OF INDUSTRIAL COATINGS. A new booklet giving instructions for applying industrial coatings. It is stated that any workman can effectively apply a protective coating if he abides by the few simple rules advanced. Emphasis is placed upon the flexibility of the human element in determining the ultimate protective or decorative qualities of coatings. The booklet also lists each type of coating manufactured by the company. *Carbozite Corp.*

IT'S NEW ✓ CHECK IT

JACK FINNEY *C. A. POWEL* *R. B. CRAGIN*

MEN IN THE NEWS

Jack Finney is now general manager of Plastic Coating Co., Houston, Tex., which was recently organized and is engaged in applying plastic coating material to oilfield equipment. **Finney** worked for Dowell Incorporated in Texas, and has also spent several years in the pipeline-coating field.

Charles A. Powel, headquarters engineering manager of Westinghouse Electric Corp., is taking leave of absence from his position to serve as chief of the electrical and radio branch of the Allied Control Commission. He will fly to Germany to assume his new post. Powel is president of the American Institute of Electrical Engineers.

Houdry Process Corp., Wilmington, Del., has opened New York offices at 115 Broadway, New York City. The new offices will be headquarters for the commercial development division, project analysis division, and foreign sales department, under the direction of **Robert B. Cragin,** vice president in charge of commercial development.

Security Engineering Co., Inc., Whittier, Calif., will be acquired by Dresser Industries, Inc., Cleveland, Ohio, according to a joint announcement by **H. N. Mallon,** president of Dresser, and **W. E. Seivers,** executive vice president of Security.

Lester D. Bigelow, vice president, Hewitt Rubber Corp., has moved to Chicago to supervise midwest sales, the same position he occupied before the war. During the war years he has been in charge of manufacturing. **Frank W. Blanchard** has been promoted from chief engineer to factory manager in charge of all production in both Buffalo plants.

Dr. Sidon Harris, president; **Paul H. Ledyard,** seismograph supervisor, and **Rolland E. Davis,** field manager, head the organization of Southern Geophysical Co., Inc., which has established offices in the Sinclair Building, Fort Worth, Tex.

Jarecki Manufacturing Co. is opening an office at 806 Central Building, Wichita, Kans., which will be in charge of **Paul E. Warmbrodt,** who has been Eastern and Western Kansas representative for the past 25 years.

H. L. Vines, director of sales for Tyson Bearing Corp., Massillon, Ohio, announced appointment of Borg-Warner International Corp., Chicago, as sales representatives in all export markets with the exception of Canada and Alaska.

E. A. France, son of **Adam Warren France,** who patented France metallic packing and founded France Packing Co., has been named president and general manager. **J. C. Allen** is the new treasurer.

McEvoy Co. represents in all the Gulf States, the West Coast, and abroad, the Kelco-McEvoy air-operated rotary slips, made and sold under license from Ben F. Kelley Co. of Tulsa, Okla.

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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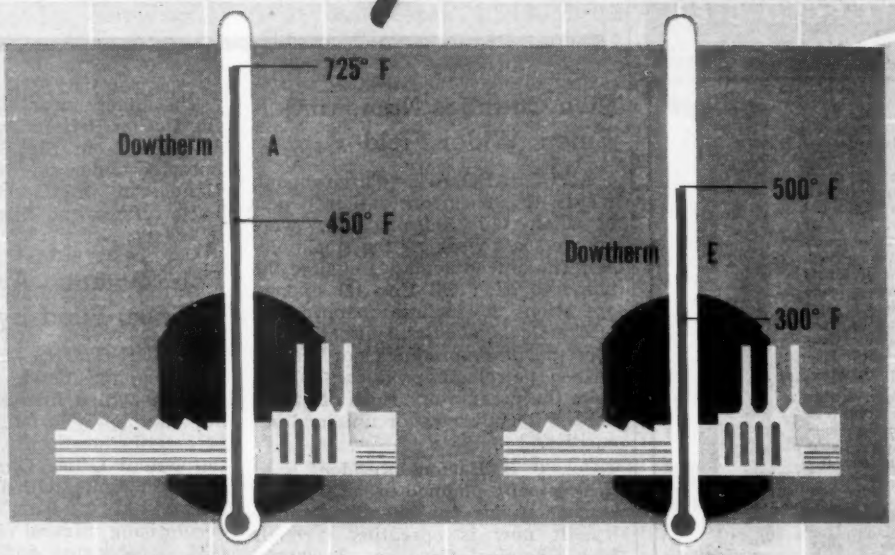
Announcing Dowtherm E



New Member of the Dowtherm Family!

Dowtherm A has a new teammate! It's Dowtherm E . . . and it's ready to extend the benefits of Dowtherm vapor heating to another important temperature bracket . . . the range between 300° and 500° F.

Dowtherm E is good news to the food, plastic, laundry, and other industries that operate with these lower processing temperatures. It makes available to them, *within their particular temperature range*, the specific advantages inherent in Dowtherm vapor heating . . . precise control, uniformity of product, economical upkeep, simplicity of operation under low operating pressure.

At higher temperatures up to 725° F., Dowtherm A has been solving difficult heating problems for many years. Now Dowtherm E brings the same accurate control . . . the same efficient, low-pressure heat transfer . . . within reach of still other industries.

Dow will be glad to give you the details about this newest Dowtherm. Just drop a line to Midland, or contact your nearest Dow office.

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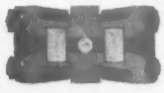
"TRANSPARENT"
DROP FORGED STEEL
LIQUID LEVEL GAGES

Used to observe color and density of liquids under high pressures and/or temperatures. Construction exceptionally sturdy. Made of alloy temperature resisting steel, and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Transparent" is one of the complete line of Penberthy gages that meet every liquid level gage requirement.



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APPROVED BY
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This double-safety lantern has a tamper-proof reflector and cover with locking device and seals. Throws 1500 ft. beam. Instantly ejects broken bulbs from battery circuit. Large handle—360° pivoting feature gives direct illumination where needed and leaves both hands free for work.

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ECONOMY ELECTRIC LANTERN CO.
3100 W. CHERRY ST. MILWAUKEE 8, WIS.

REFINING

Lion Changes Name and Enters Wider Field

EL DORADO, Ark.—Three amendments to the incorporation papers of Lion Oil Refining Co. were adopted last week by the stockholders. The amendments (1) change the name to Lion Oil Co.; (2) expand operations to include manufacture of chemicals, plastics, synthetic rubber, and other products not usually termed petroleum products; (3) revoke the preemptory right of stockholders to buy new or unissued securities.

Col. T. H. Barton, president, said the company planned broad postwar expansion into the chemical industry. It now is operating through Lion Chemical Corp., a $30,000,000 ammonia plant, which he said could be converted easily into a fertilizer plant. Lion has the right to buy this through direct negotiation with the government or by matching the highest bid.

Under the amended articles of incorporation, Lion can manufacture, refine, reduce, treat, separate, store, transport, buy, sell and distribute all grades and kinds of asphaltum, petroleum and petroleum distillates, natural and artificial gas, casinghead gasoline, sulfur, paints, oils, dyes, varnishes, carbon and hydrocarbon products.

In addition it can operate in acids, phosphates, acid derivatives, chemicals, and chemical compounds, drugs, dyestuffs, paints, plastics, oils, varnishes, fertilizers, liquid and aqueous ammonia, synthetic rubber, cements, industrial chemicals, and chemical compounds.

Work on Asphalt Plant at Big Sandy Started

DALLAS. — Rogers Lacy, independent oil operator of Longview, has started construction of a $500,000 asphalt plant at Big Sandy, Upshur County, 21 miles west of Longview. He plans to build a similar refinery in the Heidelberg, Miss., field, where he has extensive holdings.

Lacy said the Big Sandy plant will use around 3,500 bbl. of oil daily, all to be furnished by independents in the Hawkins field. He estimated this would give a production of 1,200 to 1,500 bbl. of asphalt a day.

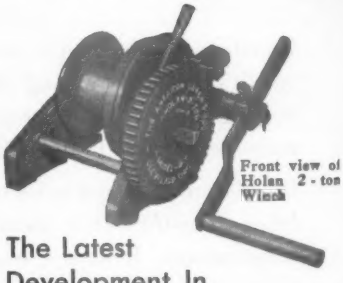
The plant, on a 23-acre site on the Cotton Belt Railroad and about ½ miles from Big Sandy, will be operated under the direction of R. P. Henderson, who has been with the Lacy refinery at Kilgore.

Four Patents, Available for License, Filed by Tietig

WASHINGTON. — Chester Tietig, 435 Reading Road, Cincinnati 2, Ohio, has filed four oil patents under the newly established register of patents for license, as shown in the Patent Office Gazette for July 24. The patents, with their numbers, follow: 1,974,089-9-18-34, process for decolorizing mineral oil; 1,957,303-5-1-34, decolorizing and filtering liquids; Re. 20,957-12-27-38, lubricating composition—heavy metal salt dissolved in oil; 2,133,761-10-18-38.

Terms of license are not stated, and the patent office assumes no responsibility, merely registering the

IT'S NEW — THE HOLAN 2-TON WINCH



Front view of Holan 2-ton Winch

The Latest Development In Compact, Easily Operated Winches — Tops in Quality

Small and compact, this winch is exceptionally easy to operate and very efficient. Two speed ratios permit handling heavy loads at slow speeds and light loads at high speeds. Perfect control is assured for raising load. When lowering load, control is secured by a single shoe hand brake that has sufficient capacity to hold full load. Full rated load is 4000 lbs., but each winch is tested at factory by applying a load of approximately 6000 lbs.

Write for Detail Information

THE AMERICAN COACH & BODY CO.
9307 WOODLAND AVE. AT E. 93RD ST.
CLEVELAND 4, OHIO

patents as filed by the owner as a clearing house where owner and prospective licensor may communicate with each other.

Contract Let for Housing Project at Rifle Plant

WASHINGTON. — Contract has been awarded for services on a housing project at the oil-shale demonstration plant of the Bureau of Mines near Rifle, Colo. The housing units, for use by about 125 plant workers, are expected to cost $240,000.

A recent progress report submitted to Dr. R. R. Sayers, director of the Bureau of Mines, by Boyd Guthrie, supervising engineer of the Rifle project, disclosed that plans and specifications for a frame office building and a boiler plant at the plant site have been completed, and that invitations for bids will be issued shortly. Bids for water and oil-storage tanks and for the design, fabrication, and erection of two N-T-U type retorts are being tabulated.

Better Postwar Gasoline Predicted by Harvison

NEW YORK. — A higher-grade gasoline will be available to American motorists after the war as a result of technical progress in refining, according to L. H. Harvison, vice president of The M. W. Kellogg Co. Analyzing the significance of the petroleum industry's vast wartime development and expansion program, Harvison emphasized that the main goal was maximum output of higher-octane products to meet war needs.

The pressing demand for 100-octane gasoline, Harvison explained, necessitated extensive technical development and plant expansion, which represented an over-all industry investment totaling $760,000,000. The Government's investment was about $210,000,000 or 28 per cent of the total.

"It is true that the improved processes now installed in many refineries may not mean an immediate reduction of gasoline prices to the consumer," said Harvison, "but it is equally true that the consumer's dollar will buy more pulling power and general service than it did in 1941.

"Termination of hostilities will leave the petroleum industry in a stronger position for consumer service than ever before. Much of the progress made in oil refining, notably in the widespread acceptance of the fluid catalytic-cracking process, while immediately focused on producing aviation gasoline for the war, is equally important to peacetime operations. It is still too early to forecast the exact octane rating of gasoline for the postwar car. This depends on the type of motor to be used."

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Crown cutters, now standard in 1" or larger sizes on all Elliott cutter heads, have a rounded contour, give more cutter contact, with no chance of sharp corners scoring tubes. Just another refinement in Elliott tube cleaners. Bulletin? Y-250
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Natural Gas

Carbon-Black Demand and Supply Now in Balance

WASHINGTON. — Although production of carbon black of rubber grades was about 31 per cent higher in the first quarter of 1945 than in the corresponding period of 1944, demand so far exceeded output that War Production Board adopted emergency measures to check consumption and raise production. The military victory in Europe resulted in a cutback of rubber requirements for the Army. This, along with increasing carbon-black output, has brought supply and demand for carbon black into close balance for the first time in 2 years.

Projected requirements of 1,000,000 long tons of synthetic rubber in 1945 and 1,200,000 in 1946, as forecast by Rubber Reserve Co., indicate that little increase in the current rate of production (296,045 long tons in the first quarter) will be required. At the same time large gains in carbon-black production are in prospect for the fall of 1945 which may raise the rate 110,000,000 lb. a month.

Thus it is expected that the supply of carbon black through 1946 will meet domestic requirements for rubber and other established uses as well as increased export demand. Many conditions that will influence demand for carbon black during the 5 years immediately following the war are not predictable. Information now available indicates that the return to heavy consumption of natural rubber will increase the demand for channel black, although its fields of application may be narrowed by the availability of suitable furnace blacks at competitive costs.

Chemicals Made on Large Scale From Natural Gas

NEW YORK. — First large-scale production of certain chemicals by a process using natural gases as raw material is announced by Celanese Corp. of America at its large new plant near Bishop, Tex., the initial unit of which has just started operations. (See picture, page 57). The principal chemicals manufactured—acetic acid, acetic anhydride, acetone, methanol, and formaldehyde—have been produced from petroleum raw materials in the past.

Acetic acid, acetic anhydride, and acetone are vitally necessary in the synthesis which produces the textile and plastic output of the company. Methanol, a widely used solvent, is utilized in the production of antifreeze, pharmaceuticals, cosmetics, inks, paints, and varnishes and many other commodities. Formaldehyde is used in the production of synthetic resins, for leather tanning and hardening, as a disinfectant, and in countless other applications.

A second unit of the chemical plant devoted exclusively to the manufacture of butadiene, main ingredient of Buna-S synthetic rubber, is about three-fourths completed.

Expansion of the chemical manufacturing operations is an outgrowth of broadening business in the textile and plastics divisions. The new plant has been under construction since November 1943. The site was chosen because of its abundance of petroleum and natural gas resources.

Commission Sets Hearing For West Pampa Project

AUSTIN.—A hearing will be held August 7 by the Texas Railroad Commission on the application of West Pampa Repressuring Association to install a gas-injection program in the West Pampa area and for special rules governing the affected portion of the Panhandle field. Parts of 32 sections of land are involved in the program.

Southern Natural Wants to Build 116-Mile Pipe Line

WASHINGTON. — At a hearing before Federal Power Commission witnesses testified to Southern Natural Gas Co.'s need for the 116-mile pipe line which it wants to build in Louisiana, Mississippi, Alabama, and Georgia, along with other facilities, including a 1,200-hp. compressor station on its Montgomery-Columbus branch line near Wetumpka, Ala. The company, with headquarters in Birmingham, owns and operates a natural-gas line from fields in Texas and Louisiana to Atlanta, with branch lines to about 50 municipalities in Alabama, Mississippi and Georgia.

C. P. Rather, president of Southern Natural, testified that he plans to modify a contract in order that his company may be supplied with gas from the Monroe field in Louisiana through United Gas Pipe Line Co.'s lines. This would enable the company to transport gas from the Carthage field in Panola County, East Texas, to Southern Natural's lines. H. McHenry, counsel for Southern Natural, said cost of the proposed facilities was estimated at $3,771,760.

W. C. Spooner, consulting geologist, of Shreveport, testified that reserves in the Carthage field, the Bear Creek field, in Louisiana, and the Logansport field in Texas and Louisiana are sufficient to supply gas for the proposed increase in outlet.

Kansas-Nebraska Seeks to Expand Its Facilities

WASHINGTON. — A hearing will be held August 15 by Federal Power Commission on the application of Kansas-Nebraska Natural Gas Co. for permission to (1) construct and operate about 20 miles of 12¾-in. transmission pipe line to reinforce the company's present system in Phillips and Rooks counties, Kansas; (2) install two 1,000-hp. compressor units and auxiliary equipment at its compressor station near Scott City, Kans.; (3) move a 250-hp. compressor station from Elm Creek, Neb., to Holdrege, Neb.

The company says the proposed facilities, estimated to cost $410,000, are needed to assure maintenance of efficient natural-gas service for war, defense, and essential civilian requirements in the Kansas and Nebraska areas it serves. They are part of the construction required, the application states, to enable the company to replace gas now purchased from Kansas Power & Light Co.

Cycling

Lone Star to Build Cycling Plant in Chapel Hill Area

DALLAS. — Lone Star Producing Co. has received from War Production Board permission to construct a cycling plant near Tyler, to cost $936,000. The plant, in the Chapel Hill gas field, was made possible, L. T. Potter, production superintendent, said, through an agreement worked out with holders of production in the Paluxy sand part of the pool, which also has production from the Rodessa zones, the Pettit lime, and the Travis Peak.

Producers in the area are Shell Oil Co., Sun Oil Co., Magnolia Petroleum Co., Sinclair Prairie Oil Co., Delta Drilling Co., and Chapel Hill Gas system.

XUM

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A Practical Suggestion to Users of Steel Pipe Protection . . .

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Corpus Christi, Texas and Harvey, La.

PIPE LINES

Sun Lets Contract For E. Louisiana Line

Sun Oil Co. has awarded contract to the J. R. Horrigan Construction Co. to lay 26 miles of 4, 6, and 12-in. pipe line from the Delhi Paluxy sand pool of Richland Parish, North Louisiana, to a barge loading terminal at Talla Bena, on the west bank of the Mississippi River. This will provide the first outlet for this pool which originally was classified as producing from the Tuscaloosa sand, widely productive in southern Mississippi.

Texas Empire Looping Proceeds by U. S. Order

Backed by a presidential proclamation signed in Germany last week and a federal court order issued in Springfield, Ill., Texas Empire Pipe Line Co. began contested construction for looping through three central Illinois counties.

An order was signed by Federal Judge Charles G. Briggle, enabling the company to continue work.

A few hours later notice was served on landowners and tenants. The easements are 50 ft. wide in a 17-mile strip crossing Logan, DeWitt and McLean counties, Illinois.

The federal legislation, enacted as a war emergency measure, never before has been invoked in Illinois and has been employed previously only five times in the nation, said Montgomery S. Winning, Springfield attorney for the pipe line company.

Associated Contractors New Construction Firm

A general partnership to engage in the oil industry has been formed by Laurence H. Favrot, George A. Peterkin, Earl Allen, J. W. Sharman and A. L. Forbes, Jr., who have organized Associated Contractors and Engineers with main offices at San Jacinto National Bank Building, Houston.

When this organization was perfected recently arrangements were made to discontinue operation of the firm of Sharman & Allen which will function only until present work is completed. Some of the contracts of Sharman & Allen have been assigned to the new Associated partnership. The firm of Sharman & Allen was founded for the purpose of carrying on pipe-line construction formerly done by Latex Construction Co. and for serving its clients while the principal officers of Latex were in the armed services.

Forbes has severed his connection with Pressure Weld Co. and will have no further concern with its business in the United States.

Among the projects contracted by Associated Contractors and Engineers are the following:

The Texas Pipe Line Co., 5 miles of 8-in. from Houma, La., pump station.

Humble Oil & Refining Co., 16 miles 7-in. and 5-in. from Dickinson to Hall's Bayou, Tex.

O. C. Whitaker Co. (subcontract for United Gas Pipe Line project) 48 miles of 24-in. from a point south of Ruston, to Sterlington, La.

Gulf Refining Co., reconditioning 23 miles of 8-in. near Sour Lake, Tex.

Interstate National Gas Co., 14 miles of 4-in., 6-in., and 12-in. near Sterlington.

WHEN YOU WANT The Best IN PIPELINE CONSTRUCTION

OKLAHOMA CONTRACTING COMPANY

DALLAS TEXAS

SOUTH AMERICA
APARTADO 1085
CARACAS, VENEZUELA

War Prospects to Fix Status of Tex.-Calif. Project

L. M. Glasco, secretary-treasurer of the Pacific War Emergency Pipe Lines, Inc., Dallas, announced that the PAW District 3 committee had recommended, with reservations, construction of a 14-in. crude-oil pipe line from Monahans, Tex., to Beaumont, Calif., near Los Angeles.

Glasco said the company's president, Angus Wynn, was informed of the action in a letter from George A. Wilson, director of supply and transportation for the Petroleum Administration for War, Washington.

The proposed 14-in. line would be 986 miles in length according to Glasco and would cost $28,000,000. With 16 pump stations the capacity of the line would be 75,000 bbl. daily.

The district committee, appointed by the PAW, recommended that PAW approve the pipe line on two contingencies:

1. If the military authorities determine that planning for the Pacific war should be based on a period sufficiently beyond the estimated time of 12 months required for construction of the line to justify the expenditure and steel and other critical materials.

2. If a study of the various supply and transportation alternatives indicates that the pipe line provides the best solution to the problem.

At Austin, Tex., Chairman Olin Culberson of the Texas Railroad Commission proposed in a telegram to President Truman that orders be issued for immediate construction of the line to relieve railroads.

In another telegram to Sen. James Mead, Democrat, New Hampshire, Culberson asked the Senate war investigating committee to consider an investigation of the need for such a pipe line.

Culberson said the movement of 13,000 tank cars is required to transport oil to California which would be carried via a pipe line.

Pacific War Emergency Pipe Lines, Inc., would prefer to build a 20-in. pipe line to cost $47,000,000, according to Glasco which would handle 175,000 bbl. daily with 17 pump stations. For such a line permission was sought last year. Glasco says that arrangements have been made for private financing of the Monahans-Beaumont project if it is finally approved by the military authorities as needed for the war program. There is a present need in California, according to Glasco, for 83,000 bbl. daily of Permian basin crude oil. It is asserted that if West Texas crude oil could be pipelined to the Pacific Coast under existing conditions, movement of freight of all kinds to the coast could be accelerated to aid the war program.

Michigan-Wisconsin Co. Is Incorporated

Articles of incorporation have been filed in Wilmington, Del., by the Michigan-Wisconsin Pipe Line Co. which will be a subsidiary of Michigan Consolidated Gas Co. and connect the Hugoton Natural Gas Field near Guymon, Okla., with Detroit.

The line also will furnish natural gas to various other associated companies of American Light & Traction Co. in Michigan, Missouri, Wisconsin and Iowa, according to William G. Woolfolk, chairman of American Light & Traction.

Lea Group to Study Natural Gas Lines

WASHINGTON.—Another federal inquiry into natural gas matters was proposed last week when Chairman Lea of the House interstate and foreign commerce committee introduced a resolution, (H. Res. 323), seeking authority for a subcommittee of his group to conduct an investigation into "the nation's transportation situation" with a view to developing postwar policy.

BUCKEYE MODEL 11 for Speed and Economy on gathering, product and natural gas lines. Digs trench 11½" to 22" wide — up to 5' deep.

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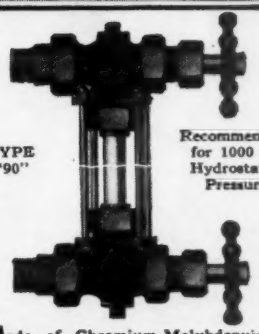

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With
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The H & M PIPE CUTTING and BEVELING MACHINE

SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.

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Available in 25 or 30 foot lengths. Each rod is carefully built from materials of known strength, composition and uniform characteristics, with rigid adherence to A. P. I. specifications and close control over each step in manufacture, including normalizing, heat treatment, forging and final precision threading. Select NORRIS QUALITY SUCKER RODS to meet your particular requirements with the assurance that you are buying maximum service at lowest cost. Send for descriptive Bulletin No. 28.

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Carbon Steel
Recommended for regular to heavy loads where corrosive conditions are not a factor. These rods are giving excellent service, replacing in many instances conventional rods of supposedly higher grades steel. A. P. I. Specifications. Box & Pin and Double Pin.

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Carbon Manganese Steel
Recommended for extra heavy pumping conditions where corrosion is not a factor. CARBON-MANGANESE steel to special Norris alloy specifications. Very high ultimate tensile strength, yield point and shock resistant qualities. Box & Pin and Double Pin.

TYPE 40
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Recommended for wells where heavy loads are encountered and where irregularities in pumping movement are unavoidable. The NICKEL and MOLYBDENUM content in this rod aids materially in their resistance to corrosion fatigue. A. P. I. Specifications. Double Pin Type only.

TYPE 60
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Fully Normalized and Precipitation Strengthened
For heavy pumping in excessively corrosive conditions. Manufactured from a special nickel copper alloy steel combining strength, ductility, and exceptional resistance to corrosion. A. P. I. specifications. Double Pin Type only.

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ARMY NAVY QUALITY MAKES FRIENDS

BUY WAR BONDS FOR VICTORY

Exploration and Drilling

Week's Highlights

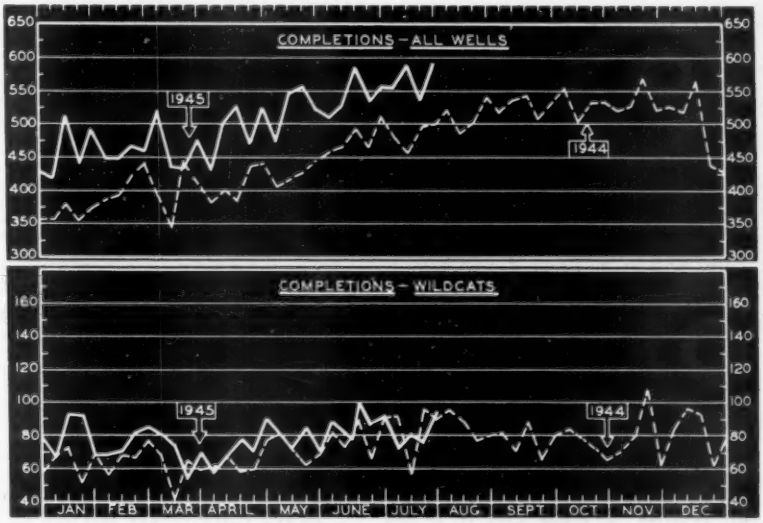
OKLAHOMA oil men are waiting for final production tests on Cities Service Oil Co. 1 Lawson, SW NW 22-5n-4w, in southwestern McClain County. A 5½-in. oil string was landed at 10,992 ft., and the operator is waiting on cement to set.

Although official information has been withheld, data generally accepted as reliable indicates this is probably one of the most important wildcat successes in Oklahoma since the discovery of West Edmond. The well probably has a total of 76 ft. of saturated pay sand in the Simpson, and a drill-stem test that included only 23 ft. of the total pay resulted in a flow of 22 bbl. per hour of 39.6-gravity oil.

The electric-log survey, it is said, gives top of Simpson dolomite at —9,657 ft., first sand zone —9,705 to —9,769 ft., including a 10-ft. shale break beginning at —9,723 ft. This was followed by a 30-ft. interval, then the second sand zone was picked up at —9,899 to —9,921 ft. This gives the first sand zone a total thickness of 54 ft., all saturated, and the second sand zone a total of 22 ft., also saturated, or a total of 76 ft.

Pre-Simpson tops were: Mississippi Caney —8,122 ft., Woodford —8,272 ft., Hunton —8,563 ft., Chimney Hill Hunton —8,827 ft., Sylvan shale —8,880 ft., Sylvan dolomite —9,002 ft., and Viola —9,037 ft.

Located in the southeast end of the Anadarko Basin, where the geological conditions are extremely complicated, the probabilities are that the well is on a local high on one of the buried spurs that plunge off the Arbuckle Mountains. Possi-



Solid line charts current weekly completions, service wells in Eastern area included

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JULY 28, 1945

	Total of all wells					Cum. to date		Wildcat completions and discoveries					Cumulative total, 1945				
	Comp.	Oil	Gas	Dry	Footage	1945	1944	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	34	17	0	*17	50,310	787	913	0	0	0	0	0	0	0	0	0	0
Pennsylvania	135	63	8	†64	208,842	2,289	2,186	0	0	0	0	0	0	0	0	0	0
West Virginia	21	10	9	2	48,982	466	500	0	0	0	0	0	0	0	0	0	0
Ohio	24	6	11	7	64,843	514	543	0	0	1	2	3	0	0	11	37	48
Indiana	1	1	0	0	2,423	106	121	0	0	0	0	0	4	0	0	15	19
Kentucky	8	5	1	2	12,684	259	387	0	0	0	1	1	16	0	2	25	43
Illinois	36	23	0	13	96,611	953	1,009	2	0	0	5	7	26	0	0	171	197
Michigan	9	2	0	7	25,216	426	355	0	0	0	5	5	5	0	2	149	156
Kansas	34	14	4	16	116,924	946	1,020	1	0	0	6	7	22	0	9	196	227
Neb., Mo., Iowa	0	0	0	0	0	12	16	0	0	0	0	0	0	0	0	9	9
Oklahoma	39	24	2	‡13	132,873	1,380	945	1	0	0	6	7	51	2	9	198	260
Texas	151	76	13	62	686,460	4,125	3,052	9	0	0	34	43	133	11	35	740	919
North Central	48	22	0	26	154,132	1,232	822	4	0	0	14	18	51	0	5	267	323
West	42	28	0	14	202,496	1,066	847	4	0	0	9	13	37	1	0	158	196
Panhandle	14	6	8	0	45,508	316	124	0	0	0	0	0	0	0	1	4	5
Eastern	4	0	1	3	20,872	189	194	0	0	0	1	1	5	5	1	52	63
Gulf Coast	27	12	3	12	192,635	934	656	0	0	0	4	4	28	4	22	155	209
Southwest	16	8	1	7	70,817	388	409	1	0	0	6	7	12	1	6	104	123
Louisiana	27	17	1	9	182,319	578	438	2	0	0	4	6	20	3	4	74	101
Northern	14	7	1	6	56,304	211	164	2	0	0	4	6	6	1	4	43	54
Southern	13	10	0	3	126,015	367	274	0	0	0	0	0	14	2	0	31	47
Arkansas	3	2	0	1	17,458	102	125	0	0	0	1	1	0	0	0	27	27
Mississippi	7	4	0	3	47,713	202	77	0	0	0	3	3	3	0	0	65	68
Southeastern States	3	1	0	2	11,901	35	21	0	0	0	2	2	0	0	1	23	24
Montana	6	4	0	2	13,152	181	178	0	0	0	0	0	7	0	0	12	19
Wyoming	2	1	0	1	9,720	112	91	0	0	0	1	1	9	0	0	22	31
Colorado	1	0	1	0	5,481	22	17	0	0	1	0	1	1	0	1	3	5
New Mexico	9	7	0	2	35,180	250	225	0	0	0	1	1	8	0	3	34	45
California	46	38	0	8	162,676	1,340	1,118	0	0	0	6	6	1	0	2	129	132
Total United States	596	315	50	231	1,931,768	15,085	13,337	15	0	2	77	94	306	16	79	1,929	2,330
Total previous week	533	294	55	184	1,864,327	14,489	12,793	8	3	5	59	75	291	16	77	1,852	2,236
Total July 29, 1944	459	272	55	132	1,682,397	13,337	9,481	11	1	1	77	90	237	20	69	1,783	2,109

Service wells included: *17, †61, ‡1.

bilities of large faulting exist, which may have thrown the Cherokee shale into contact with Simpson sands somewhere in the vicinity.

Whatever conditions exist, Cities Service obviously has faith in its geophysical picture, since, on sealed bids, it paid $1,202 per acre bonus just recently for 110 acres of Indian land within a mile of the well.

SOUTH LOUISIANA

Potential Test Scheduled For So. St. Gabriel Test

NEW ORLEANS.—In the South St. Gabriel area of Iberville Parish, Noble & Baker are preparing to run potential test at 1 W. E. Caldwell, discovery well, 52-9s-2e. On previous test it flowed at the rate of 264 bbl. per day through ⅛-in. choke, 11 per cent salt water, tubing pressure 1,900 lb., casing pressure 2,700 lb., gravity 42°. Total depth of the hole is 9,305 ft. with 7-in. casing set to bottom. This well is also credited with a sand showing oil at 8,798-8,810 ft., which was not tested.

Humble Oil & Refining Co. 1-H Miami Corp., wildcat in Bayou Cardin area in T-16s-8e, St. Mary Parish, is waiting on cement to set after setting 7-in. casing to 11,849 ft. Total depth is 11,919 ft. and log had been run to that depth and some sidewall samples taken before running pipe.

In Vermilion Parish, 6 miles north of Abbeville field, Ohio Oil Co. 1 Lelande, wildcat in 8-11s-3e, is waiting on cement to set after a squeeze job following drill-stem test which recovered salt water. Test in perforations at 11,046-50 ft. had recovered 65 stands of salt water, 3 stands of mud, and 1 of sand. Second test, depth not reported, recovered 6,000 ft. of salt water. Total depth is 11,968 ft. with 5½-in. casing set to 11,957 ft.

Of the 13 new locations reported this week 4 were wildcats, 2 located in Calcasieu Parish, and 1 each in St. Landry and Terrebonne parishes. There were 13 completions, 10 being producers in proven areas, no wildcats. St. Mary and Vermilion parishes led with three completions each.

TEXAS GULF COAST

New Production Opened In Liberty County

HOUSTON.—New production for Liberty County is being opened at Glenn H. McCarthy 1-A A. G. Blanke, wildcat in Levi Barrow Survey, Abstract 137, about 3 miles northeast of Hankamer. This test showed for a good gas-condensate producer on drill-stem test near the 8,500-ft. level and is now setting tubing and packer for a production test. Total depth is 8,500 ft. with casing set near bottom.

Sinclair Prairie Oil Co. is preparing to set casing in 1 W. A. Schweke "A," wildcat about 2 miles southeast of New Ulm, in Austin County. Production has been indicated on a drill-stem test at 9,155-68 ft. where it recovered about 500 ft. of 36° gravity oil. Total depth is 10,013 ft.

Three miles southeast of Blessing in Matagorda County, Amerada Petroleum Co. and Sun Oil Co. 1 W. T. Morrison et al, in the John Holmes Survey, Abstract 191, blew out at a total depth of 10,227 ft. and is now pumping in mud to kill.

Of the 14 new locations this week, only 3 were wildcats, 2 in Brazoria County and 1 in Fayette County. There were 18 completions, 4 being dry wildcats. Brazoria County led with five completions, all dry. Jackson and Jefferson counties take the lead with two producers each.

UPPER GULF COAST WILDCAT FAILURES

Brazoria County: General Crude Oil Co. 1 Geo. H. Bingham et al, Francis Bingham Sur. 13, 1 mi. SW of Juliff, dry at 9,005 ft.

Salt Dome Oil Corp. and Butcher-Arthur, Inc. 1 Elmer and Norman Doonan, Thos. Spraggens Sur., Abst. 368, Tract 17, 2 mi. NE of Manvel, dry at 7,202 ft.

Jackson County: Rowan & Hope and Newman Bros. 1 Hollingsworth Ranch, Eli Mercer Sur., 12 mi. N of Edna, dry at 4,762 ft.

Wharton County: Donald W. Moore and T. J. Ahern 1 Hans Johnson, L. L. Miller Sur., Sec. 46, 1 mi. W of Danevang, dry at 8,002 ft.

SOUTHWEST TEXAS

New Gas Pool Opened In Dimmitt County

CORPUS CHRISTI.—A new gas pool has been opened in Dimmitt County, 4½ miles southwest of Carrizo Springs, by Calatexia Oil Co. 1 S. E. McKnight, in Section 35, Block 13. Drilled to a total depth of 2,995 ft. this test was completed as a dry gas well, official gage not available as yet. The 5½-in. casing was set at 2,764 ft. and perforations are in an 8-ft. section at around 2,660 ft.

A new gas-condensate pool has been opened in Willacy County, 3 miles southwest of Raymondville, by Magnolia Petroleum Co. and J. S. Abercrombie Co. 1 H. H. Dohe, in San Juan Carricitos Grant, Section 3, Lot 6. Drilled to a total depth of 10,560 ft., test is being completed through perforations at 10,000-40 ft. The 7-in. casing was set at 10,015 ft. and 6-in. liner set to bottom.

George Parker and Charles L. McCune 1 H. Weid, wildcat, 5 miles northeast of Hebbronville, in the Diego Hinojosa Survey, Duval County, was dry at total depth of 5,012 ft.

There were 46 new locations reported this week, 11 of which are wildcats. South Campana and Tijerina fields led with 10 and 6 new locations, respectively. Duval and Victoria counties each had two wildcat locations; other wildcats in Bastrop, Jim Hogg, Jim Wells, Kleberg, Live Oak, McMullen and Webb counties. Of the 25 completions 7 were wildcats, 1 being an oil discovery in Live Oak County. Falls City, Kelsey, Seeligson, and Stratton fields each had two completions.

SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Live Oak County: Albert West discovery—Continental Oil Co. 2-A Albert West, M. Cronican Sur., Abst. 135, 1½ mi. SE of Kittie, TD 7,387 ft., perf. 24 holes, 6,720-22 ft., PT 103 bbl. per day through a 9/64-in. choke, gas-oil ratio 5,100 to 1, TP 1,700 lb., CP 2,200 lb., gravity 34°, 4 per cent water.

SOUTHWEST TEXAS WILDCAT FAILURES

Bexar County: Walter Bode & Pegg Bros. 1 Volney Peterson, H. Virm Sur. 195, 5 mi. SW of McDonna, dry at 1,238 ft.

Brooks County: Sun Oil 3 Mary M. Lasater, HE&WT Sur. 349, 6 mi. SE of Falfurrias, dry at 6,526 ft.

Duval County: George Parker and Charles L. McCune 1 H. Weid, in Diego Hinojosa Sur., Lot 1, 5 mi. NE of Hebbronville, dry at 5,012 ft.

LaSalle County: Quintana Petroleum Corp. 6-F South Texas Syndicate, 5½ mi. SE of Washburn field, in R. Jourdan Sur. 28, dry at 5,892 ft.

McMullen County: Dee Davenport 3-A Annie Graves Dolph et al, Sec. 54 of C. C. Shumway subd. of Shiner Ranch, 6½ mi. SW of Ezzell field, dry at 1,590 ft.

Milam County: Curtis Kelley and Don

DAILY AVERAGE PRODUCTION FOR WEEK

	July 28 crude oil	Distillate, allied products	August PAW quota all oils	July 21 crude oil
Alabama	1,000	.....	500	1,000
Arkansas	79,550	5,400	85,400	79,750
California	946,150	60,900	1,012,900	951,500
Colorado	12,000	.....	12,000	12,100
Eastern	63,800	6,300	71,500	66,250
Florida	250	.....	.....	250
Illinois	199,900	12,000	212,000	204,400
Indiana	13,500	.....	13,000	13,500
Kansas	278,450	4,500	278,500	282,350
Kentucky	29,700	2,600	30,600	29,300
Louisiana	367,300	42,000	402,000	367,300
North Louisiana	70,400	.....	.....	70,400
South Louisiana	296,900	.....	.....	296,900
Michigan	47,700	800	47,800	45,300
Mississippi	51,650	.....	53,000	52,300
Montana	23,700	300	22,300	23,700
Nebraska	850	.....	1,000	900
New Mexico	104,100	6,800	111,800	103,050
Oklahoma	390,400	28,000	408,000	390,750
Texas	2,209,400	166,000	2,356,000	2,209,400
East Texas	379,500	.....	.....	379,500
East Central Texas	139,000	.....	.....	139,000
North Central Texas	152,300	.....	.....	152,300
Texas Panhandle	87,500	.....	.....	87,500
West Texas	521,400	.....	.....	521,400
Southwest Texas	360,750	.....	.....	360,750
Texas Gulf Coast	568,950	.....	.....	568,950
Wyoming	108,800	3,500	121,700	106,500
Total United States	4,928,200	339,100	5,240,000	4,939,600
Change from previous week	down 11,400			
Total production January 1-July 28, 1945				1,006,030,600 bbl.
Same period last year				938,468,500 bbl.

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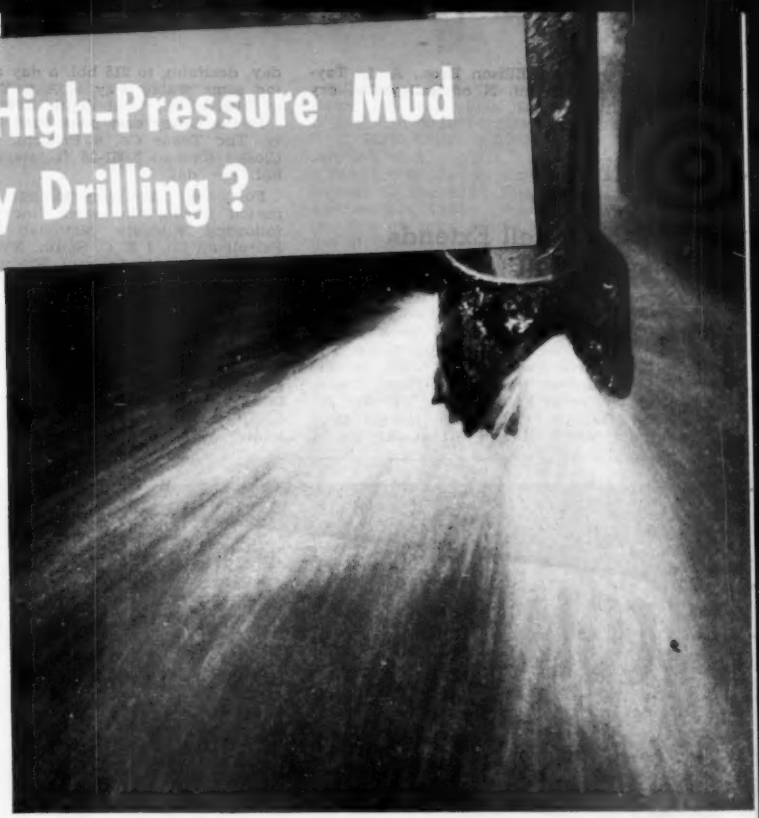

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McGregor 1 Ellison Bros., A. L. Taylor Sur., 1 mi. N of Baileyville, dry at 1,498 ft.

ILLINOIS

361-Bbl. Well Extends Herald Pool in Gallatin Co.

CENTRALIA. — Thirty-six wells were completed in the past week in review, 23 oil wells and 13 dry holes. The oil wells averaged 100 bbl. each in initial production, the largest being Frank King, Jr. et al 1 Jones, S½ NW SW 22-7s-9e, Gallatin County, a Herald pool outpost, which started off at 361 bbl. a day, declining to 215 bbl. a day and showing some water. Pay is Aux Vases sand at 2,904-12 ft., total depth 2,913 ft.

In the Olney east pool, Richland County, The Texas Co. 6 Fritschi, with McClosky lime at 3,081-85 ft., started at 263 bbl. per day.

Forty-two new operations were reported during the week, including the following wildcats: National Associated Petroleum Co. 1 E. C. Smith, NW NW SW 15-6n-3e, Fayette County; Wilson Drilling Co. 1 Crowell heirs, SE SE NW 24-1n-13w, and F. C. Edwards et al 1 Strive heirs, NW NE NW 13-1n-14w, Wabash County; Homer Luttrell and S. D. Jarvis 1, NW NE NW 36-6s-9e, White County; D. E. Schock 1 Lancaster, SE SE NW 1-5n-8e, Jasper County; Texas Co. 1 A. Bowyer, SE SE NW 34-1s-5e, Wayne County; Magnolia Petroleum Co. 1 Zahn estate, SE NW NE 26-4s-4e, Jefferson County; Ashland Oil & Refining Co. 1 C. J. Snyder, NE SE NE 8-5s-7e, Hamilton County; Sohio Oil Co. 1 E. J. Huber, SE SE NE 5-4n-5w, Madison County; Sam Males 1 Funk, NE SE NE 32-4n-10w, Lawrence County; Hiawatha Oil & Gas Co. 1 J. Bennett, SW NE SW 10-3n-10e, Richland County, and Inland Oil Co. 1 H. Lichtenfels, SW SW SE 22-1s-3w, Washington County.

ILLINOIS SUCCESSFUL WILDCATS

Hamilton County: J. W. Rudy 1 Marlow, NW NW SE 29-3s-7e, McClosky lime 3,384-92 and 3,401-08 ft., acidized, pumped 25 bbl. of oil and 9 bbl. water. Extends Aden pool.

White County: B. M. Heath 1 Storms, NE NW SW 2-6s-10e. McClosky lime at 3,038-41 and 3,076-78 ft., acidized, pumped 38 bbl. of oil, 4 bbl. water. Discovery well.

ILLINOIS WILDCAT FAILURES

Edwards County: C. E. Skiles 1 Jacob, SW SW SW 5-3s-14w, dry at 3,232 ft. McClosky lime 3,144-46 and 3,149-53 ft.

Gallatin County: S. C. Yingling 1 R. H. Hale, NW NW NE 26-7s-9e, dry at 3,130 ft.

Madison County: Fosterburg Drilling Co. 1 Bassett, NW NE NW 23-6n-9w, dry at 1,500 ft.

Schuyler County: H. M. Miller 1 Fowler, SE NE SE 10-3n-3w, of the 4th p.m., dry at 710 ft.

Washington County: Magnolia 1 Labuda, NE NW NE 18-3s-1w, dry at 1,661 ft. Benoist sand 1,330 ft., Aux Vases 1,432 ft., M. Fredonia 1,600 ft.

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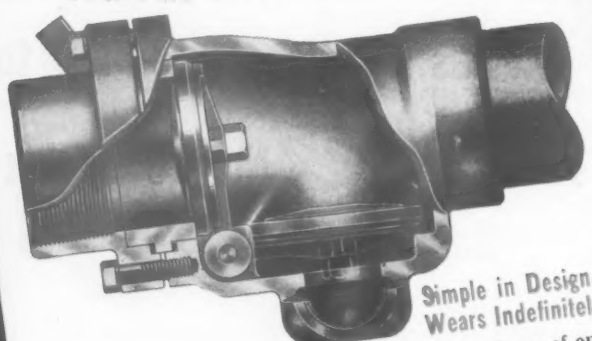

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MICHIGAN

Only Two Producers Completed During Week

SAGINAW. — Michigan oil exploration received another setback in the past week. Of nine completions only two were producers. Five of the seven dry holes were wildcat tests. Twelve new locations were announced.

New production included a 30-bbl. well in the growing Coldwater field of Isabella county and a well in Rose Township, Ogemaw County, that acidized for 206 bbl. a day.

New well locations are for four tests in Mecosta County, two in Isabella, and one each in Bay, Van Buren, Clare, Newaygo, Kent, and Kalamazoo counties.

The conservation department, involved now in a controversy over Michigan lakes pollution possibilities, will offer 25,000 acres of state-owned land for lease and an oil and gas rights auction August 31 in Lansing. Best of the option land is regarded as a 40-acre plot south of the prolific Coldwater field where at least 40 good producing wells have been drilled.

The controversy stems from objections by the cities of Saginaw and Bay City and Saginaw valley sportsmen's groups to the granting of permits for drilling near the shores of Saginaw Bay and a belief, strongly denied by the department, that it is working toward a policy of leasing submarginal lands.

MICHIGAN WILDCAT FAILURES

Allegan County: Dorr Township: Oil Producers, Inc. 1 Frank and R. Kunard, SW SW NE 20-4n-12w, dry in Traverse limestone, TD 1,607 ft.

Isabella County, Union Township: Rowmor Corp.-Leonard Drilling Co. 1 Charles Lea, SE NE SE 7-14n-4w, dry, TD 1,670 ft.

Osceola County, Evart Township: Taggart Bros. Co. 2 Sherlock-Davy, C NE 20-17n-8w, dry, TD 1,469 ft.

Sanilac County, Buel Township: Shell Oil

Co., Inc. 1 J. Burch, NE NW SE 15-10n-15e, dry, TD 5,820 ft.

Van Buren County, Pine Grove Township: Harris Oil Co.-Del Fortney 1 A. M. Todd Co., SW SE SW 36-1s-13w, dry in Traverse limestone, TD 1,300 ft.

CALIFORNIA

Buena Vista Allowable Cut 25 Bbl.

LOS ANGELES.—The increasing trend of Buena Vista Hills field, reflecting the progressive completion of new wells in the 27-B zone, has been temporarily arrested by a reduction in the allowable well production from 300 to 275 bbl. per day.

Shell Oil Co., Inc. widened the Seal Beach field approximately ½ mile by completing 3-1 Bryant near the Naval hospital at Seventh and Bellflower streets flowing 323 bbl. of 32.6-gravity oil and 150,000 cu. ft. of natural gas daily through a 24/64-in. bean from 10,194 ft. Completion of this well proves up several additional locations. Perforations are at 8,600-9,190 ft., 9,260-430 ft., 9,460-828 ft., 9,873-985 ft., and at 10,045-120 ft., indicating favorable thickness of oil sand. The company has taken in the entire oil zone in contrast with normal operations which are usually restricted to selected sections.

Interest in the Pacific Northwest continues at a brisk rate, the latest entrant into that district being Richfield Oil Corp. The Texas Co. is going ahead with its first hole at Clatskanie, Ore., but it is not yet deep enough to reach the interesting stage. Standard Oil Co. of California has budgeted money to start exploratory work early in 1946. Standard's initial test will be drilled in Whatcom County, Washington, where extensive leasing has been completed.

Locations were staked for 54 new wells to be drilled in California in the immediate future. Elk Hills led with six new locations and South Belridge followed with locations for four more wells. The remainder were scattered. Only two wildcat locations showed up this week along with one location in Rio Vista gas field. Most of the projected drilling will be in San Joaquin Valley fields, this area showing 31 locations as compared with 9 for the Coastal District and 11 for Los Angeles Basin. Union abandoned its second Elwood wildcat but is starting on another to be drilled on the Moran lease in Section 1-4n-19w.

CALIFORNIA WILDCAT FAILURES

Kern County, Cantil: J. & S. Exploration Co. 3 Crookshank, 19-30s-28e, bottomed in hard gray sand, no important showings, TD 2,951 ft.

Gould Hills: Hilo Oil Co. 1 Atlas, 8-29s-21e, bottomed in barren gray sand, no important showings, TD 6,010 ft.

Lerdo: Richfield 2 Lerdo, 33-28s-27e, bottomed in gray sand, form. test 3,273-98 ft. recovered drilling fluid, no oil or gas, TD 3,607 ft.

Mount Poso: U. S. Drilling Co. 33-2 S.P., 33-26s-28e, bottomed in gray sand, Vedder sand of Miocene age was barren, TD 1,685 ft.

Los Angeles County, La Habra: Hilo Oil Co. 1 Cinnabar, 1-3s-11w, bottomed in gray sand, only minor showings, TD 6,004 ft.

San Joaquin County, Banta: Shell 1 Wright, 32-2s-6e, bottomed in gray sand, form. test 3,338-40 ft. flowed water, form. test 3,355-65 ft. flowed water, form. test 2,500-2,670 ft. flowed water, form. test 2,295-2,305 ft. flowed water, no showings in bottom of hole, upper sands were wet, TD 5,321 ft.

N. CENTRAL TEXAS

Continental Wildcat Opens New Pool in Simpson

WICHITA FALLS.—Continental Oil Co. 1 Borden, wildcat in the northeast corner of Jack County, has opened a new pool in the Simpson. Total depth is 6,884 ft. The Ellenburger at 6,870 ft. tested salt water. The casing was perforated in the Simpson from 6,720-6,860 ft. The well flowed 185 bbl. of 42° gravity oil with 1,500,000 cu. ft. of gas in 8 hours through 1-in. choke on 2-in. tubing. It flowed 16½ bbl. of oil the last 30 minutes of the test. Gas-oil ratio was 1,553 to 1. It was shut in for storage.

Sussex Oil Co. 1 Wilday, west outpost to the Wood Bend conglomerate pool of northwestern Clay County, has been completed for 169 bbl. of 42° gravity oil in 22 hours through perforations from 5,931-51 ft. Total depth is 6,200 ft. Gas-oil ratio was 360 to 1.

The Texas Co. 2 Murrell Unit, north outpost to the GNB Ellenburger pool of northeastern Cooke County, drilled sand showing oil from 4,189-4,210 ft. A 20-minute drill-stem test of this section showed gas in 10 minutes and recovered 200 ft. of oil and 70 ft. of salt water. It was drilling below 4,432 ft. in shale. Panhandle Producing and Refining Co. 1 Keeter, east offset to the discovery well in the Tharp Caddo pool of eastern Throckmorton County and the second producer for the pool, was perforated opposite the Caddo from 4,240-60 ft. and treated with 1,000 gal. of acid. The swab was run twice and the well kicked off and flowed 200 bbl. of oil in 2 hours. It is being connected to storage.

(Continued on page 136)

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KANSAS

Barber County Wildcat Has 1,700-Ft. Fillup

J. M. HUBER CORP. 1 Roard, NE SW NE 9-31-14w, a wildcat about 4 miles north of Skinner pool, Barber County, had a fillup of 1,700 ft. of oil after perforations were made in the Maquoketa at 4,363-65 ft. Operator is running tubing and rods to test. Previous perforations in the Arbuckle recovered water.

Barton County: Good porosity and saturation was logged in the Arbuckle in the Lion Oil & Refining Co. 1 Hammeke, SW SW NW 13-19-12w, 3 miles north of Ellinwood. Pipe is being set to test the well, after three drill-stem tests failed because the packer failed to hold.

Decatur County: Continental Oil Co. 1 Brown, NE NE NE 33-3-27w, a rank wildcat approximately 14 miles north of the Adell pool of Sheridan County, has set pipe to test shows of oil. Fair stain and porosity was logged in the Lansing at 3,522-29 ft., 3,561-65 ft., and good stain and porosity at 3,617-28 ft. Pipe has been set at 3,767 ft., after drilling to a total depth of 3,982 ft.

Ellis County: Darby & Bothwell, Inc., 1 Cromb, NE NW NW 22-11-20w, about 5 miles west of the Solomon pool, has reported good saturation in the Arbuckle at 3,682-85 ft. Pipe was set at 3,682 ft., and unit is being moved in to drill plug.

KANSAS SUCCESSFUL WILDCAT

Rooks County: New Oil Pool—Darby & Bothwell 1 Vohs, NE NE NE 14-10-19w, physical potential 380 bbl. of 29-gravity oil from Arbuckle at 3,557-62 ft., TD 5,562 ft.

KANSAS WILDCAT FAILURES

Barber County: Lion 1 Lemon "C," SE NE NE 20-30-13w, dry, TD 4,643 ft., Arbuckle 4,639 ft.

Driller's Gas 1 Gant, NE SW SE 6-31-13w, dry, TD 4,793 ft., Arbuckle 4,743 ft.

Hodgeman County: Darby & Bothwell 1 Faulkner "A," SW SW SW 11-22-26w, dry, TD 5,126 ft., Arbuckle 5,084 ft.

Sheridan County: Sterling Drilling 1 Fulton, NW NW NW 14-6-27w, dry, TD 4,431 ft., Mississippi lime 4,420 ft.

Stafford County: Phillips 1 Effie, NE NE NW 36-24-13w, dry, TD 4,757 ft., Granite 4,754 ft.

Trego County: A. R. Jones & Hershfield 1 Wahlborg, SE SE SE 23-15-22w, dry, TD 4,715 ft., Arbuckle 4,690 ft.

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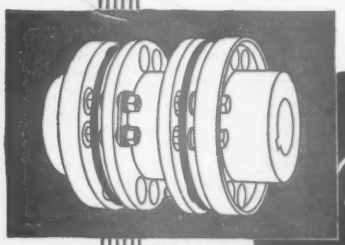

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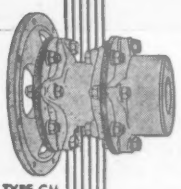

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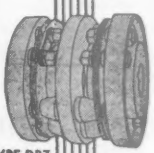

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PERMIAN BASIN

TXL Gets Biggest Producer to Date

MIDLAND.—The Texas Co. 1-C Fraser, ¼-mile west extension in the southeastern part of the TXL pool of western Ector County, has been completed for the largest producer in the field so far. On the last 4 hours of a 6-hour official test it flowed at the rate of 2,985 bbl. of 39° gravity oil daily through perforations from 7,860-7,960 ft. Flow was through a 1-in. choke on 2-in. tubing. Gas-oil ratio was 1,005 to 1. Total depth is 8,001 ft.

Atlantic Refining Co. 1-B TXL, 2 miles north of 1-A TXL, the first test in the TXL pool to show oil in the lower Permian lime. Recovery was 500 ft. of oil and gas-cut mud with some shows of gas and 500 ft. of water with some gas. The test is a diagonal northwest offset to Phillips Petroleum Co. 1-A TXL, second Ellenburger producer in the pool. It was drilling below 7,574 ft. in lime.

Texas 29 W. E. Connell, wildcat 2 miles west of the Penwell field in southwestern Ector, made a 75-minute drill-stem test from 4,590-4,700 ft. in the Holt zone. It recovered 360 ft. of drilling mud with a little free oil on top. It was drilling below 4,844 ft. in lime. Sinclair Prairie Oil Co. 1 Williamson, wildcat 3 miles northwest of the TXL pool, was drilling below 9,028 ft. in shale.

Andrews County.—Magnolia Petroleum Co. and Humble Oil & Refining Co. 1 E. P. Cowden, wildcat in the southwest corner of the county, made a 1-hour drill-stem test from 7,893-7,932 ft.; gas showed in 52 minutes and 3,060 ft. of clean oil was recovered. On a later drill-stem test from 7,932-69 ft., with tool open 1 hour, 630 ft. of mud cut with oil and gas was recovered. Both tests were in the Devonian. It is drilling ahead at 7,971 ft. in chert. On the latest drill-stem test in the Ellenburger, Shell Oil Co. and Texas 1 Ratliff & Bedford, four-pay prospect in southwestern Andrews, flowed 25.5 bbl. of clean oil in 30 minutes from 11,277-11,301 ft. Tool was open 1 hour and 40 minutes. The well has recovered oil on every drill-stem test since entering the Ellenburger at 11,018 ft., 7,814 ft. below sea level. Total depth is 11,369 ft., where another drill-stem test will be run. Five and one-half miles southeast of this test, Sinclair Prairie Oil Co. 1 George F. Ratliff ran a 1-hour drill-stem test from 7,935-8,012 ft. and recovered 80 ft. of slightly oil-cut drilling mud. It was drilling below 8,012 ft. in lime.

Humble has staked two outposts to its discovery, 1 J. A. Jackson, in southeastern Lamb County, now called the Anton pool. The first test is in Hockley County, 1 mile south of the discovery. The second is in Lamb County, 1 mile west of 1 Jackson.

Richardson & Bass 1 KCS, wildcat 2¾

miles southeast of the Keystone Ellenburger area, is dry at 10,673 ft. in the Ellenburger. The same company's 8-E Bashara, test on the north side of the Keystone pool, flowed 606 bbl. of 42° gravity oil in 6½ hours in the Ellenburger at 9,940 ft., total depth.

The following fields led in completions this week: Slaughter field, Hockley County, had six; Fullerton field, Andrews County, had three, and McCamey field, Upton County, and Waddell field, Crane County, each had two. Crane County led in new locations with the nine offsets

(Continued on page 136)

EASTERN TEXAS

LaRue Discovery Offset Shows Some Gas

DALLAS.—Lone Star Production Co. 1 Murchison & Wofford, offsetting the company's discovery well in the LaRue pool of northern Henderson County, is showing a little gas while testing through perforations from 8,347-53 ft. On an earlier drill-stem test from 8,220-27 ft., there was a slight blow of gas and 300 ft. of oil and gas-cut mud, 700 ft. of mud slightly cut, and 7,100 ft. of salt water was recovered. Humble Oil & Refining Co. 1 Leone Plantation, Navarro Crossing pool of northwestern Houston County, has been completed for 66,000,000 cu. ft. of gas daily, open flow, at total depth of 6,208 ft.

This district reported three field completions this week, one each in Long Lake field, Anderson County; Calvert field, Robertson County, and Carthage field, Panola County. The Carthage field led in field locations with four.

EASTERN TEXAS WILDCAT FAILURE

Panola County: W. H. Mitchell 1 Temple Lumber Co., Mary Strickland Sur. A-597, 3½ mi. E Dotson, elev. 381 ft., Hill 5,700 ft., dry, TD 6,889 ft.

APPALACHIAN FIELD

Onondaga Topped at 6,008 Ft. in Washington

PITTSBURGH.—In Robinson Township, Washington County, southwest Pennsylvania, The Texas Co. topped the Onondaga lime at 6,008 ft. in the wildcat on J. P. Walker farm which starting from a surface elevation of 1,102 ft. places it —4,906 ft. Test is 7,500 ft. north of a deep test drilled some years ago by Peoples Natural Gas Co. on R. A. Geary (Cummins) farm which found water in the Oriskany sand which filled the hole. In that test the top of the Onondaga was —4,958 ft. or 52 ft. lower than the new test.

In Huntington Township, Westmoreland County, near the Jacktown Hotel on U.S. Route 30, Acme Die & Tool Co. completed a test on M. J. McMahan farm in the Hundred-Foot sand, total depth 2,485 ft., and the initial open flow was 10,000,000 cu. ft. of gas which blew down to 1,500,000 at the last report.

In Ravenswood district, Jackson County, West Virginia, Columbian Carbon Co. is drilling through the Oriskany sand in the 797 T. W. Armstrong with the top of the Corniferous lime at 4,748 ft.; Oriskany at 4,862 ft., and at 4,878 ft. a gage of 3,711,000 cu. ft. gas was recorded.

In Fayette County, the test of United Carbon Co. on Loup Creek Colliery Co. in Kanawha district was dry through the Berea sand, 2,215-35 ft., and it was bottomed at 2,310 ft. and will be plugged.

In Marsh district, Raleigh County, Columbian Carbon Co. bottomed 776 Rowland Land Co. at 3,823 ft. through the Berea which had a gage of 21,000 cu. ft. of gas which was acidized, increasing it to 81,600 cu. ft. Tubing is being pulled and the Weir sand will be shot.

New locations in West Virginia totaled six or one each in Jefferson district, Nicholas County; Booths Creek district, Taylor County; Buckhannon district, Upshur County; Clay district, Wirt County, and two in Baileyville district, Wyoming County. In southwest Pennsylvania, there were eight new locations of which three were in Armstrong County, one in Clarion County, two in Greene County, and two in Westmoreland County.

CANADIAN FIELDS

Steveville-Princess Test Is Being Deepened

CHATHAM.—In the south end of the Steveville-Princess field, Empire Pacific 2, LSD 16, 22-19-12w3, offsetting Empire Pacific 1 to the south, and started as a test of the Devonian limestone, cored into Madison limestone at 3,302 ft. with good porosity at 3,306-19 ft. A drill-stem test showed 2,500,000 cu. ft of wet gas increasing to 2,700,000 cu. ft. with a good percentage of colored distillate. Test is being deepened into the Madison. Empire-Pacific 1, LSD 27-19-12w4, sponsored by a group of companies including Pacific Petroleums, Empire Petroleums, Princess

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Petroleums and California-Standard, was finished at 3,322 ft., encountering oil in the chert erosion band above the Madison, and finishing with 75,000 cu. ft. gas and around 140 bbl. of 26.7°-gravity oil. The new area is 6 miles south of California-Standard C.P.R. 18-21-A, discovery well in the Devonian limestone, which has averaged better than 110 bbl. on steady production.

Conrad.—In the Conrad field, southern Alberta, Conrad-Province 17-5-A, LSD 16, 5-6-15w4, finished in the Ellis at 3,124 ft., had 110 bbl. daily initial production. Conrad-Province 33-5-A, LSD 7, 5-6-15w4, finished at 2,962 ft. had 60 bbl. daily. California-Standard has one well testing and three new locations. In the Warner area 10 miles west of the Conrad field, B. & B. Syndicate 1, LSD 1, 29-5-17w4, finished at 3,455 ft. with a fair noncommercial show in the Ellis. B. & B. 2 is making location.

Coalspur.—In the Coalspur area of the northern Alberta foothills, Canada's deepest well, Imperial-Coalspur 1, LSD 10, 3-49-21w5, bottoming at 12,955 ft., has abandoned efforts to overcome a fishing job and is testing oil shows in horizons above the Madison limestone.

Turner Valley.—In West-Central Turner Valley, Miracle Oils 3, LSD 11, 4-19-2w5, originally a naphtha producer from the Madison limestone, is producing on the pump from the Home sand, and will be a fair light-crude producer.

Taber.—Commonwealth Petroleums of Calgary is commencing systematic drilling of a 2,000-acre holding in the west section of the Taber field, southern Alberta. Commonwealth 1 in LSD 11, 22-9-17w4, about ¾ mile north of two good California-Standard producers, is rigging.

Saskatchewan.—Bata Petroleum 7, LSD 13, 13-20-23w3, in the Vera-Unity field, western Saskatchewan, got around 5,000,000 cu. ft. of gas in the Viking sand at 1,630 ft. which was increased to around 10,000,000 ft. from a second porous zone in the basal lower Cretaceous at 2,035-64 ft. The well is the best yet drilled in the Vera-Unity field.

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ROCKY MOUNTAIN

Rangely Field May Have Another Shallow Pay

DENVER.—In the Rangely field, Texas Co. 1-32 Union Pacific, NE NW 32-2n-102w, encountered a good sand in the Morrison formation below the Dakota, and a 10-minute drill-stem test at 3,234-45 ft. filled up in 8 minutes and the well began to flow 34.4° gravity crude. Drilling was resumed and it now stands at 5,595 ft., top of the Weber, waiting on cement, after running 133 sacks between the 7 and 10¾-in. casing.

This is the first well in the field to show oil in the Morrison. Whether that sand was passed up in other wells or is lenticular and therefore absent in other parts of the field has not yet been determined, and a study of the logs will be made to ascertain the facts.

Kutz Canyon wildcat shows gas.—A wildcat being drilled on the east side of the Kutz Canyon gas field, San Juan County, New Mexico, Southern Union Production Co. 1 Cain, C SW SW 15-28n-10w, showed for an estimated 3,000,000 cu. ft. of gas in the Farmington sand at 1,350 ft. The Picture Cliff sand at 2,000 ft. is the normal producing horizon. This is the first gas found in the Farmington in this field. In other areas the Farmington wells seldom exceed 500,000 cu. ft. per day.

Kutz Canyon deep test.—Transcal Petroleum Corp. 1 Davidson, NW NW 28-28n-10w, headed for the Dakota at 6,300 ft., lost the hole at 5,750 ft. after drilling through 190 ft. of Point Lookout sand with good shows of oil and gas. The rig may be skidded and another hole drilled.

Powder Wash outpost completed.—Mountain Fuel Supply Co. 3 Allen, SE SE NW 33-12n-97w, an outpost on east side of Powder Wash field, northwestern Colorado, was drilled to 5,481 ft., plugged back and completed in sand at 4,525-36 ft. for 3,598,000 cu. ft. of gas. On the way down it cut two gas sands and three oil sands. A 45 minute drill-stem test in sand at 4,361-93 ft. showed oil at the rate of 100 bbl. per hour.

Gas well at Devon.—Texas Co. 3 Wier, NW SW NE 4-33n-1e, Devon district, Toole County, Montana, is a near completion at 1,655 ft., 6 ft. in the Madison lime. After acidizing with 500 gal., it made 24,000,000 cu. ft. of gas and 15 gal. of water and 1 pint of oil per hour. This is the most westerly of five wildcats drilled in search of a pool in that district.

Gas at East Muskrat.—Shannon Oil Corp. 1 State, SW NW NE 16-33n-91w, a wildcat on East Muskrat, adjoining the Sinclair-Wyoming Oil Co. gas operation at Muskrat, was drilled to 4,574 ft., and cemented 7-in. on bottom preliminary to testing gas show in the Frontier sands. Indications are that it will make a nice gas well.

Baca County test spuds.—Skelly Oil Co. 1 Joe Hankins, SE SE NW 34-33n-44w, Baca County, southeastern Colorado, began spudding July 23 to go to 6,000 ft. The siliceous lime is expected at around 5,500 ft. This is the first deep test in the county.

New operations.—New operations were all development wells of which two were in the Cut Bank field in Montana, and three in Kevin-Sunburst in the same state.

Completions.—Ten wells were completed in the Rocky Mountain area, of which five were oil wells with an initial production of 478 bbl.; four were dry, and

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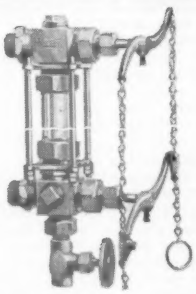

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one was a gas well. This compares with 22 completions last week. Only one of this week's completions was a wildcat. Montana accounted for 6 out of the 10, of which 4 were in Kevin-Sunburst and 2 in Cut Bank.

COLORADO SUCCESSFUL WILDCAT

Moffat County, Powder Wash: Mountain Fuel Supply 3 Allen, SE SE NW 33-12n-97w, TD 5,481 ft., plugged back and completed in sand at 4,525-36 ft. for 3,598,000 cu. ft., oil sands at 3,622-52, 4,342-58 and 4,361-93 ft., other gas sand at 4,020-47 ft.

WYOMING WILDCAT FAILURE

Weston County, Mush Creek: Elben Syndicate 1 Government, SE SW NE 24-44n-62w, TD 4,800 ft., dry, slight show of oil in Newcastle (Muddy) sand at 3,851 ft.

NORTHWEST NEW MEXICO WILDCAT FAILURE

San Juan County, Kutz Canyon: Transcal Petroleum 1 Davidson, NW NW 28-28n-10w, TD 5,750 ft., 400 ft. off Dakota sand, lost hole, may skid and drill another.

LA.-ARK.

Richland Parish Adds New Tuscaloosa Pool

SHREVEPORT. — Completion of Southport Petroleum Co. 1 Howard, NW NW NW 4-16n-8e, marks the opening of a new pool for Richland County. Situated about 5 miles southwest of the Delhi pool, and about 8 miles east of the Richland gas pool, the well is producing from the same formation as the Delhi pool. Initial production was 258 bbl. from the Tuscaloosa at 2,965-75 ft.

The Delhi pool added another good producer in the C. H. Murphy, Jr., and Sun Oil Co. 14 Holt, 200 ft. north of center of SE NE 29-17n-9e. The well made 276 bbl. from the Tuscaloosa at 3,355-65 ft.

North Louisiana completions this week totaled 14, including 7 oil wells. Bellevue pool headed the list with three successful completions. In the Arkansas fields, three wells were completed, including oilers for Atlanta and Stephens pools, and a dry wildcat in Colombia County.

ARKANSAS WILDCAT FAILURE

Columbia County: McAlester Fuel 1 Couch, NW SW 11-16s-20w, dry, TD 6,793 ft.

NORTH LOUISIANA SUCCESSFUL WILDCATS

Rapides Parish: New oil pool—Louisiana Land & Exploration A-2 Bentley Lumber Co., 700 ft. south and 2,900 ft. west of NE cor. 36-5n-5w, 50 bbl. per day from Wilcox at 6,488-94 ft., TD 7,285 ft.

Richland Parish: New oil pool—Southport Petroleum 1 Howard, NW NW NW 4-16n-8e, 258 bbl. per day from Tuscaloosa at 2,965-75 ft., TD 3,434 ft.

NORTH LOUISIANA WILDCAT FAILURES

Madison Parish: V. S. Parham 1 Kathan-Johnson, 100 ft. south and 25 ft. west of center of NE SE 35-18n-10e, dry, TD 4,564 ft.

Rapides Parish: Louisiana Land & Exploration C-1 Bentley, NW NE 25-4n-5w, dry, TD 7,802 ft.

Richland Parish: Humphrey & Wynne 1 Valentine, S/2 SW NE 12-15n-6e, dry, TD 5,020 ft.

West Carroll Parish: California 1 Hodge-Hunt Lumber Co., SW NW 6-19n-9e, dry, TD 7,039 ft.

OKLAHOMA

Cimarron County Wildcat Swabs Oil on Test

PURE Oil Co. 1 Oklahoma State, SE SE NW 7-5n-8 ecm, the company's fourth test on the Keyes structure in Cimarron County, swabbed 7½ bbl. of oil and 2½ bbl. of acid water from the basal Pennsylvanian Conglomerate in the Cherokee, at 4,786-4,890 ft., after acidizing twice, with a total of 7,000 gallons. Cardwell unit is being moved in to clean out hole with cable tools and preparations are being made to shoot. Of the three previous tests on this structure, 2 have been big gas wells and 1 a dry hole.

Major County.—Superior Oil Co. 1 Manning, NE NE NW 27-22n-10w, after drilling to 8,274 ft., probably ending in Mississippian, plugged back and is flowing 3½ bbl. per hour of 38° gravity oil from a Pennsylvanian sand around 6,700 ft., believed to be the Prue or equivalent.

McClain County.—Cities Service Co. 1 Lawson, SW NW 22-5n-4w, Oklahoma's hottest wildcat, is reported to have drilled out cement to within 20 ft. of bottom and is preparing to run tubing and perforate for final tests.

Beckham County.—A. R. Jordan et al 1 Caudill, SE NW NW 35-9n-25w, which looked good on drill-stem test in granite wash at 3,040 ft., was a disappointment, filling up with 1,500 ft. of fluid, mostly salt water when the plug was drilled.

New locations announced last week including wildcats, totaled 52 compared to 39 completions. New wildcats announced totaled 7, the same as the number completed. Of the 39 field completions, 5 were in West Edmond and 2 in East Pauls Valley. Wildcat starts were 1 each in Grady, Noble, Pontotoc, Seminole and Stephens counties, and 2 in Okfuskee County.

OKLAHOMA SUCCESSFUL WILDCAT

Pontotoc County: New oil pool—J. L. Shaw 1 Broyles, NE NE NW 33-5n-6e, pumped 30 bbl. of 38-gravity oil per day from Hunton at 2,710-60 ft., TD 3,038 ft., Hunton 2,576 ft., Sylvan 2,763 ft., Viola 2,886 ft.

OKLAHOMA WILDCAT FAILURES

Comanche County: Macbon & Warmack 1 Crowe, SW SW NE 27-2n-10w, dry, TD 1,675 ft., granite wash 1,616 ft.

Garfield County: Sinclair Prairie 1 Weber, NW NW NW 28-20n-4w, dry, TD 6,518 ft., second Wilcox 6,390 ft.

Okfuskee County: Deep Rock 1 Reynolds, NE NE SW 12-11n-10e, dry, TD 4,115 ft., second Wilcox 4,102 ft.

Oklahoma County: A. R. Jordan 1 Bourne "B," SW NW NE 14-14n-1w, dry, TD 6,011 ft., second Wilcox 5,980 ft.

Okmulgee County: O. C. Moffitt 1 Furr,

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NE SE NE 21-11n-12e, dry, TD 2,031 ft., in sand.

Seminole County: Oklahoma Natural Gas 1 Arhalokoche, SE SE SE 28-10n-8e, dry, TD 3,570 ft., Cromwell 3,552 ft.

MISSISSIPPI

Brumfield Sand New Producer for Tinsley

JACKSON. — Tinsley field, in Yazoo County, has been given a good new producing zone by the Sohio Petroleum Co. B-1 Brumfield, NW SW 1-10n-3w. Deepened from its original total depth of 4,826 ft. to a depth of 6,021 ft., the well indicated production possibilities in several Eutaw sands, one of which, the Brumfield sand (called this by Sohio), has not been productive previously in this field. The Brumfield sand was perforated at 5,766-93 ft., and on initial tests, flowed 23 bbl. per hour of clean oil through ¼-in. tubing choke.

Ten new locations have been announced for Mississippi this week, including two wildcats. C. E. Walters will drill the 1 King, SW SE 30-1n-12e, in Jasper County, and the Carter Oil Co. will drill the 1 Bridgeforth, NW SE 24-12n-1e, in Yazoo County.

MISSISSIPPI WILDCAT FAILURES

Jones County: Gulf Refining 1 Grayson, SW NE SE 18-9n-13w, dry, T.D. 8,662 ft., Comanche 8,420 ft.

Neshoba County: H. H. Hamilton 1 Kirkland, NE NE 3-12n-12e, dry, TD 4,010 ft., Massive sand 3,290 ft.

Rankin County: Love Petroleum et al 2 Denkmann, SW NW 22-7n-4e, dry, TD 6,298 ft., Tuscaloosa 6,296 ft.

ALABAMA WILDCAT FAILURES

Clarke County: California 1 Scotch Lumber Co., 660 ft. south and 3,336 ft. west of NE corner of S½ 25-10n-1w, dry, TD 5,144 ft.

Washington County: J. T. Parks 1 Hobson, SW NE 9-8n-2w, dry, TD 3,185 ft., Eutaw 2,990 ft.

OHIO, KENTUCKY

Columbiana County Pool Gets 8-Mile Extension

COLUMBUS. — Interest in the Columbiana County Oriskany pool was increased considerably by the completion last week of an 8-mile northeast extension. Completed by Ohio Oil Co. 1 D. B. McCuen, Section 11, Goshen Township, Mahoning County, the Oriskany sand found at 3,608-26 ft. gaged 1,101,000 cu. ft. and was shut in after shot at 3,980,000 cu. ft. with a rock of 1,300 lb.

A new Macksburg and Maxon sand gas pool is being developed in the middle part of Dunham Township, Washington County, and to date seven wells have been completed. The last completion, C. H. Roberts 1 James H. Smith, Section 11, gaged 750,000 cu. ft. in the Macksburg. Top of the sand was 1,241 ft. and well was completed at 1,261 ft.

Of the 24 completions this week, Ashland-Lorain led with 8, while Mt. Vernon led in new locations with 6.

OHIO SUCCESSFUL WILDCAT

Mahoning County, Goshen Township: Ohio Oil 1 D. B. McCuen, Sec. 11, Oriskany 3,608-3,626 ft., 3,980,000 cu. ft., TD 3,636 ft.

OHIO WILDCAT FAILURES

Medina County, Homer Township: Wasson & Co. 1 John Stine, Sec. 3, Clinton 2,896-2,902 ft., dry, TD 2,964 ft.

Wayne County, Plain Township: Glen Harmon 1 Paul Guenther, Sec. 6, Clinton 3,056-3,064 ft., dry, TD 3,125 ft.

WESTERN KENTUCKY

OWENSBORO.—Joe Reznik et al 1 M. L. Woodal, a prospective pool opener in Crittenden County, 7-K-20, 11 miles northeast of Marion, on a drill-stem test recovered 500 cu. ft. of gas, 189 ft. of clean oil and 100 ft. of oil-cut mud and fresh water in 1 hour from Bethel (Benoist) sand at 1,387-1,400 ft. Casing is being set.

WESTERN KENTUCKY WILDCAT FAILURE

Henderson County: C. Wood 1 Reichert estate, 17-Q-22, 3 mi. NW of Geneva, dry, TD 2,686 ft., elev. 365 ft., Ste. Genevieve 2,521 ft., no McClosky, St. Louis 2,680 ft.

EASTERN KENTUCKY

Oil activities this week were slow, with no completions and no wildcats reported. Several wells are drilling, but no important ones are at the testing stage.

INDIANA

EVANSVILLE.—One 70-bbl. well was the total completion list for Indiana this week, although four drilling permits were granted, one each in Jay and Posey counties, and two in Spencer County. Sinclair-Wyoming 6 Elliott, NE SE SW 14-5s-14w, Posey County, was good for 70 bbl. of oil and 20 bbl. of salt water at total depth of 2,423 ft.

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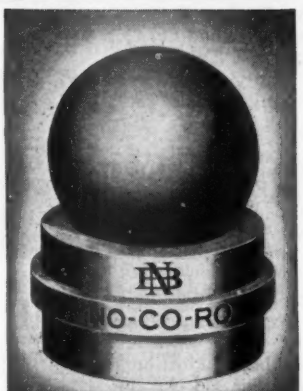

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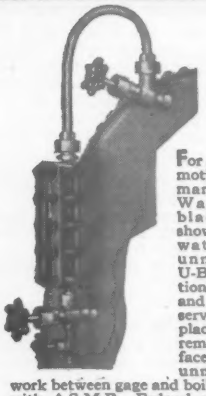

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Among the Drilling Contractors

Union Drilling & Producing Co. is the contractor on the Rex Oil & Gas Co. 1 S. Mayer and H. Lehnert, in SE SW NE 7-14n-7w, Mecosta County, Michigan.

Helmerich & Payne, Inc., is contractor on the El Dorado Refining Co. 1 Ververka, in SW NW SE 29-8-19w, Rooks County, Kansas, wildcat test for which surface pipe has been set. Contractor has a quarter interest in the test, another quarter being owned by Ed Swearer.

E. V. Hilliard will drill the L. R. Reese 1 State-Forest, in NW NW NE 19-23n-7w, Missaukee County, Michigan.

Big Chief Drilling Co. was moving in for a Cromwell test on a 900-acre block west of the Bearden pool in Okfuskee County, Oklahoma. The test is the 1 Kennedy, in SE SE NE 4-10n-9e, which may go to the Wilcox if outcome of the Cromwell formation is unsatisfactory.

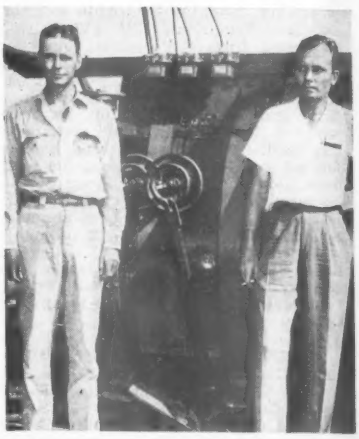
Muskegon Development Co. is contractor on the Gulf Refining Co. 1 Anastasia, in SW NW NE 16-14n-6e, Bay County, Michigan.

Kingery Drilling Co. has the contract to drill a test for Allied Oil Co. and W. T. Shelton in SE SW SW 23-3n-8e, Pontotoc County, Oklahoma. Operators are seeking Wilcox sand production.

C. B. Miller has been awarded contract to drill the Fletcher-Leman 1 George and John Bussies, in SE NE NE 16-3n-14w, Allegan County, Michigan.

Atlantic Oil Co., California drilling contractor as well as a producing company, has been awarded contracts to drill three additional wells for Cleveland Oil Co. in the Wilmington field. Atlantic recently redrilled and deepened one well for Cleveland Oil Co. and has it on production.

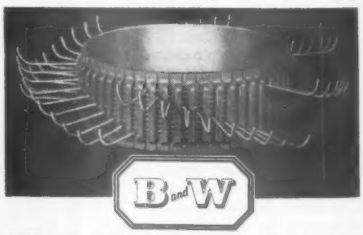
E. M. Shields will drill the Socony-Vacuum Oil Co., Inc., 1 Lucy Thomas et al (Comm.), in SE SW SE 11-12n-6w, Montcalm County, Michigan.



Lawrence Courtney, tool pusher, and Gilbert Rowe, chief engineer, Rowan Drilling Co., on one of Rowan's rigs operating in the Gulf Coast area

Geotechnical Corp. (Canada), Ltd., of Calgary, Alta., has undertaken an extensive survey in the Bow Island area of southern Alberta, with D. M. Steel in charge.

Ajax Drilling Co. will drill the C. L. Maguire, Inc., 2 Walter Sisco, in N½ SE SE 28-16n-6w, Isabella County, Michigan.



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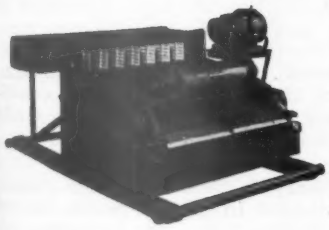

Handles the output from 20" mud pumps after surface hole is drilled. Average capacity 650 gallons per minute. Completely unitized. Screening surface—16 square feet. Domestic shipping weight less drive—1600 pounds. Headroom—27 inches. See Composite Catalog or write for details.

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MARKET QUOTATIONS

Prices as of July 31, 1945

(This service is abbreviated because most refinery products are selling at the Government's price ceilings. Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gallon.)

REFINERY GASOLINE

Octane (A.S.T.M.)	76†	70-74
Mid-Continent*	6.75	5.875
Gulf Coast	6.75	5.625
Northeast Coast	...	9.075
California	....	6.50-7.00

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.500	5.400
North Texas (f.o.b. plant)	4.125	4.950
North Louisiana (f.o.b. plant)	4.375	5.250
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per bbl.	
East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois Basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas	1.08

Note: Exclusive of subsidy.

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma Kansas	Gulf Coast Texas	West Tex.*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT

Week ended July 21, 1945
(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Distillate	Stocks: Residual
East Coast	793	13,278	8,478	6,708
Appalachian	145	4,309	478	371
Ill., Ind., Ky.	842	19,215	5,231	2,598
Okla., Kan., Mo.	382	8,579	2,117	1,374
Inland Texas	224	2,904	399	901
Tex. Gulf Coast	1,124	14,675	6,114	5,730
La. Gulf Coast	278	4,258	1,716	1,054
North La., Ark.	92	2,595	658	206
Rocky Mt.	129	2,329	355	664
California	918	13,788	9,912	22,674
Total 7-21-45	4,927	*85,930	35,458	42,480
Total 7-14-45	4,945	85,401	34,804	41,469
Total 7-22-44	4,677	80,768	37,216	55,744

*Military 29,677. Civilian 46,253.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended—	Bbl. of crude*
July 21, 1945	218,108,000
July 14, 1945	216,355,000
July 22, 1944	225,294,000

*Excludes unrefinable California stocks.

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XUM

PERSONALS

He Is Enthusiastic Over Horses as Well as Oil

R. SHINN'S enthusiasm isn't limited to oil. It extends to horses. Shinn, who recently was promoted to assistant general superintendent of production for General Petroleum Corp., can tell you the records of all the tracks and race horses in California. He owned several horses, but sold them when he moved from Taft to Vernon, Calif., to take up the duties of his new post.

Shinn worked for several oil companies before joining General Petroleum in 1913 as a foreman in the production department at Taft. He became superintendent of production at Ventura in 1921 and 3 years later was sent back to Taft as superintendent of the Central Midway division. In 1938 he was advanced to superintendent of Consolidated San Joaquin division, holding that post until his promotion to general superintendent of production.

Shinn was the first chairman of the San Joaquin chapter of American Petroleum Institute and served on various A.P.I. committees there. He was a member of the San Joaquin Valley drilling practice committee of the Institute for several years. He is top man in General Petroleum's safety club.

George A. Severson is the new acting assistant manager of the Texas Petroleum Co. in Venezuela.

G. E. Mosier, appraisal engineer and assistant office manager in the oil production division of Cities Service Oil Co., Bartlesville, Okla., has resigned after more than 20 years with the company and its affiliates, to enter consultant work as a geologist.

W. L. Morrison, manager; **C. P. Alexander,** tool pusher, and **O. C. Young,** mechanic, for The Livermore Corp. of Lubbock, Texas, recently spent a few days in Buenos Aires, Argentina, en route to Punta Arenos, Chile, where their firm will soon start two tests for Corporacion de Fomento (Chilean Government).

Rubert J. Lindquist, New York, vice president, treasurer, comptroller, and a director of Curtiss-Wright Corp., will go to Chicago about September 1 to become financial vice president of Standard Oil Co. (Indiana), centralizing supervision of financial, accounting and tax affairs.

Frank E. Richardson has withdrawn from the firm Foreman-Richardson-Baird. Richardson was formerly chief engineer of Great Lakes Pipe Line Co. and later manager of Pan American Pipe Line Co.

C. G. GERHOLD

C. G. Gerhold, formerly head of the development department of Universal Oil Products Co., has been appointed manager of Universal's Riverside research and development laboratories. He succeeds **R. B. Day,** manager for the past 7 years and relieved at his own request. **Dr. L. S. Kassell** continues as technical coordinator.

R. H. Newton, formerly drilling and production superintendent for Mene Grande Oil Co. in Maracaibo, has retired. He plans to remain in Venezuela.

H. L. Thatcher, president of Thatcher Oil Co., Chattanooga, and chairman of National Council of Independent Petroleum Associations, has been appointed an ex-officio member of Petroleum Industry War Council. He succeeds the late Phil Williams. Thatcher for several years was president of Tennessee Oil Men's Association.

Laurance S. Reid, formerly assistant chief engineer for Southern Natural Gas Co., has been appointed professor of chemical engineering in the College of Engineering, University of Oklahoma. His duties will be divided between teaching and research. At present he is making studies in natural-gas dehydration and other problems connected with production, gathering and processing of gas-condensate mixtures at high pressures.

Rogers Lacy, Longview, Tex., oil operator, has announced that at the close of the war he will build a 20-story, 700-room hotel in Dallas, costing $4,000,000. It probably will be named Hotel Lacy.

M. W. Bowen, Central European division manager in the foreign trade department of Socony-Vacuum Oil Co., Inc., has been appointed to the newly formed Middle East committee of National Foreign Trade Council. The committee is to analyze Middle East commercial conditions and to recommend trade policies.

Henry A. Guntz, formerly second lieutenant in the Army Air Forces as assistant base photographic officer, has been released from service to return to his position as subsurface geologist with Mene Grande Oil Co. at Santa Tome.

Dr. C. Perez de la Cova has joined the Phillips Venezuelan Oil Co. as chief of the land division. He was formerly director of the Department of Concessions and Cartography of the Oficina Technica de Hidrocarburos.

Ivan Cunningham has been transferred from Caracas to the New York office of Creole Petroleum Corp. as comptroller. He was for-

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Hercules' exclusive Cone Packing has successfully withstood more than 2,000 pounds pressure. Cone Packing practically eliminates friction . . . will not burn out if well pumps-off. The need for wabblers is eliminated. No foreign lubrication is required. But most important to YOU, Hercules Cone Packing will outlast old-style ordinary packing many times . . . is easy to install and is moderately priced!

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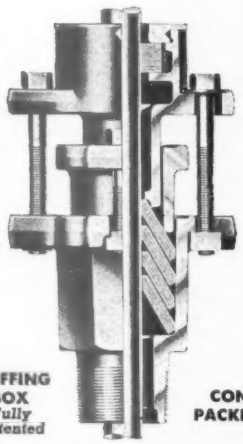

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merly an assistant general manager for Creole.

Walter Wittlinger, former landman at Wichita, Kans., for Cities Service Oil Co., has been transferred to Bartlesville, Okla., as assistant superintendent of the land and lease department.

W. V. VIETTI

W. V. Vietti, formerly chief petroleum engineer in the producing department of The Texas Co. in Houston, has been made assistant to the manager of the department. He succeeds **Howard S. Cole, Jr.,** who resigned to become a vice president of Thompson-Carr, Inc. Vietti joined Texas in 1929 as a petroleum engineer. Following several promotions he was sent to Colombia as manager of The Texas Petroleum Co. He was assigned to further responsible posts there and returned to this country 2 years ago.

Harvey A. Jarvis, president of Cia. Nativa de Petroleos, S. A., Buenos Aires, Argentina, recently visited the Manuel Elordi, Salta refinery of his company, then spent a day at the central camp of Standard Oil Co. S. A. Argentina at Tortagal before returning to his headquarters.

E. J. Handley, geophysics department, Shell Oil Co., Inc., has been transferred to the Tulsa office as a supervisor, from Denton, Tex., where he was seismologist.

Henry Stewart, chief technician for Cia. Nativa de Petroleos S. A. refinery at Campaña, Argentina, left that country in July for a vacation at his home in Alexandria, Va. Before returning he will spend several months visiting various subsidiary refineries of Standard Oil Co. (N. J.) in the states.

W. J. Connelley, manager of refining for Creole Petroleum Corp., New York City, recently visited Buenos Aires, Argentina, where before his transfer to New York 1½ years ago he was president of Cia. Nativa de Petroleos, S. A.

CALENDAR

October

American Association of Oil Well Drilling Contractors, Oklahoma City, October 1-2.

Texas Mid-Continent Oil and Gas Association, Rice Hotel, Houston, October 4-6.

I.P.A.A., annual membership meeting, Tulsa, October 15, 16 and 17.

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MASTER VALVE
WITH
UNEQUAL FLANGES

The ORBIT GEAR OPERATED MASTER VALVE makes your Christmas Tree more compact by eliminating the use of an adapter flange—also eliminating chances for additional gasket leaks. The Unequal Flanges are cast integral with the body of the Valve.

Orbit Gear Operated Master Valve

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See 1944 Composite Catalog

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Phone Fairfax 0057
Warehouse 407 Velasco Street
Houston

Rex E. Galloup, Phone 6436, Lubbock, Texas

ORBIT VALVE COMPANY
TULSA, OKLAHOMA

N. Central Texas

(Continued from page 125)

Henderson pool, Clay County, and Ellis & Dubose pool, Jack County, each had two completions. The Henderson and Kinder pools, Jack County, each reported two new locations.

For West Central Texas, Jones County led in completions with two in Wimberly field and one each in the Stith field and Jones County Regular field. There were four new field locations in this district, one each in Eastland, Jones, Coleman, and Stephens counties.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCATS

Cooke County: New oil pool—Douglas Helms 1 Lee Blocker, J. Rodriquez Sur. A-880, 1½ mi. SE Myra, elev. 888 ft., pumped 31 bbl. day, perf. 1,588-94 ft. sand, TD 1,602 ft.

Extension to old oil pool—Sun 1 Mabel Field, M. J. Eason Sur., 1 mi. S Sivells Bend pool, flowed 244 bbl. day through ⅜-in. choke, perf. 6,670-82 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington 25, D. C. Notice is hereby given that sealed bids will be received until, and opened at noon on Thursday, August 16, 1945, for land described herein situated within the known geologic structure of the Hugoton gas field, undefined, Oklahoma and Kansas. This land is offered to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act as amended by the Act of August 21, 1935 (49 Stat. 674, 30 U.S.C. sec. 226) in the following parcels: Oklahoma, C. M., Parcel No. 1, T. 4 N., R. 14 E., sec. 20, SE¼NE¼, 40 acres. Parcel No. 2, T. 4 N., R. 14 E., sec. 29, SE¼SE¼, 40 acres. Parcel No. 3, T. 3 N., R. 16 E., sec. 24, SW¼NW¼, 40 acres. Parcel No. 4, T. 4 N., R. 16 E., sec. 27, SW¼SW¼, 40 acres. Parcel No. 5, T. 6 N., R. 16 E., sec. 10, lot 2, 30.35 acres. Parcel No. 6, T. 2 N., R. 12 E., sec. 31, lot 1, 40.29 acres. Kansas, 6th P. M., Parcel No. 7, T. 26 S., R. 36 W., sec. 29, N½NW¼, 80 acres. Total 310.64 acres. Annual rental will be at the rate of 25 cents per acre so long as the land is valuable for gas; but upon discovery of a valuable deposit of oil within the known geologic structure in which all or a part of the land is situated, rental will be not less than $1 per acre. Bids must be submitted on each parcel separately. Each bidder must submit with the bid one-fifth of the amount bid in cash, or by certified check made payable to the order of the Treasurer of the United States and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The envelope should be plainly marked, "Bid for Parcel No. ..., Hugoton gas field. Not to be opened before noon, Thursday, August 16, 1945." No bids received after the hour fixed herein for the opening of bids will be considered. The remainder of the bonus and the annual rental at the rate of 25 cents per acre must be paid and a $5,000 corporate surety bond must be furnished by a successful bidder prior to the issuance of a lease. The deposits of the other bidders will be returned upon acceptance of the successful bids by the Secretary of the Interior. The successful bidder will be required to agree not to discriminate against any employee or applicant for employment because of race, creed, color, or national origin, and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.

LEGAL

Notice of Oil and Gas Lease Sale: The Southern Ute Indians will lease by bid approximately 480 acres. Bids to be opened August 20, 1945. Information may be secured from Floyd E. MacSpadden, Superintendent Consolidated Ute Indian Agency, Ignacio, Colorado.

Strawn, gravity 41.7°, gas-oil ratio 400, TD 7,024 ft.

Young County: New oil pool—Fain-McGaha 2 H. O. Prideaux, A. Rohus Sur. A-2288, 2 mi. NW Markley, elev. 1,076 ft., flowed 402 bbl. day through ½-in. choke, perf. 3,622-37 ft. Strawn, gravity 42°, gas-oil ratio 420, TD 3,637 ft.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: McCarty & Coleman 1 Mrs. J. H. Turberville, Robert Carson Sur., Sec. 177, 9 mi. W and 3 mi. N Archer City, dry, TD 1,520 ft.

Jack County: J. B. Daniel 1 L. W. Carney, Isham Farris Sur. A-220, 2 mi. E and 1 mi. N Hess, elev. 1,216 ft., dry, TD 3,210 ft.

Lesco 1 S. V. Vanhooser, Sec. 1, BS&F Sur. A-79, 8 mi. SW Bryson, elev. 1,159 ft., Mississippian 4,640 ft., Ellenburger 4,840 ft., dry, TD 5,051 ft.

Montague County: Humble 1 G. H. Williams, J. F. Broadstreet Sur., 7 mi. NE Sunset, elev. 980 ft., dry in Bend, TD 6,221 ft.

NuEnamel Oil 1 A. R. Agee, Lot 21, Kaufman CSL, 3 mi. N and 4½ mi. E Nocona, elev. 916 ft., Caddo 4,722 ft., granite 5,370 ft., dry, TD 5,371 ft.

Throckmorton County: C. C. Winfrey et al 1 Margaret Daws, C. W. Marquess Sur. A-236, 15 mi. SW Throckmorton, elev. 1,236 ft., dry, TD 705 ft.

Wichita County: Bishop Oil 1-A P. P. Langford et al, Sec. 6, GC&SF Sur. A-734, 6 mi. E and 2 mi. N Electra, elev. 1,137 ft., dry, TD 1,679 ft.

Bridwell Oil 1 Bruce Gillis, Sec. 11, AB&M Sur. A-339, 5 mi. N of Fowlkes, elev. 1,146 ft., dry, TD 2,129 ft.

Frank Wood et al 1 J. J. Cabe, Blk. 270, Waggoner Colony lands, 3 mi. N and 2 mi. W Electra, elev. 1,154 ft., dry, TD 2,203 ft.

WEST CENTRAL TEXAS SUCCESSFUL WILDCAT

Jones County: New oil pool—S. A. Roberts 1 O. J. Cooper, Sec. 29, Blk. 15, T&P Sur., 4 mi. NE Hawley, elev. 1,691 ft., flowed 228 bbl. day through 1-in. choke on 2-in. tubing, perf. 2,327-35 Swastika, gravity 40°, TD 2,332 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Jones County: Hunt Oil 1 Lewis, C. E. DeWitt Sur. No. 254, 3 mi. N Hodges, elev. 1,652 ft., Reef 3,028 ft., dry, TD 3,341 ft.

Texas 1 M. O. Johnson, Sec. 178, Blk. 3, BBB&C Sur., 3 mi. N Leuders, elev. 1,580 ft., Caddo 4,822 ft., Ellenburger 5,200 ft., dry, TD 5,618 ft.

Ted Weiner & Lice, Inc. 1 V. S. Turner, Sec. 26, D&DAL Sur., 2 mi. SW Avoca, elev. 1,565 ft., dry in King, TD 2,134 ft.

Parker County: Continental 1 Dobbs, Hugh Brown Sur., 2½ mi. SE Poolville, elev. 1,073 ft., Mississippian 5,507 ft., Ellenburger 6,090 ft., dry, TD 6,413 ft.

Shackelford County: Hedrick Oil 2 Mrs. Chloe A. Nail, Sec. 121, ETRR Sur., 13 mi. NW Albany, elev. 1,730 ft., Tannehill 1,265 ft., dry, TD 1,592 ft.

Permian Basin

(Continued from page 127)

to Atlantic Refining Co. 1-A University, five in Sand Hills-Tubb field and four in the McElroy field. Garza field, Garza County, reported five.

WEST TEXAS SUCCESSFUL WILDCATS

Cochran County: New oil pool—Stanolind 1 J. F. Edwards, Sec. 13, Blk. L, PSL Sur., 11½ mi. W and S of Rhodes pool, elev. 3,807 ft., San Andres 4,310 ft., top pay 5,040 ft., flowed 387 bbl. day through 2-in., perf. 5,025-80 ft. San Andres, gravity 32°, gas-oil ratio 670, plugged back to 5,080 ft., TD 5,111 ft.

Garza County: Extension to old oil pool—Honolulu and Devonian 1 H. F. Richardson, Sec. 1282, BS&F Sur., 1½ mi. SE P.H.D. pool, elev. 2,944 ft., San Andres 2,780 ft., top pay 3,511 ft., pumped 83 bbl. day through 2-in. tubing, perf. 3,511-25 ft. San Andres, gravity 37.2°, gas-oil ratio 320, TD 3,525 ft.

Irion County: New oil pool—Shell 2 Fayette Tankersley est., Sec. 10, GC&SF Sur., 5⅝ mi. SE Mertzon shallow pool, elev. 2,280 ft., flowed 96 bbl. day through ½-in., perf. 7,195-7,200 ft. Strawn, gravity 45.4°, gas-oil ratio 384, plugged back to 7,246 ft., TD 8,408 ft.

Upton County: New oil pool—Humble 1 J. M. Parrott et al, Sec. 3, EL&RR Sur., 18 mi. NE Rankin, elev. 2,699 ft., pumped 5 bbl. day, perf. 9,410 to 9,860 ft. Pennsylvanian, gravity 42.3°, gas-oil ratio 610, plugged back to 9,944 ft., TD 10,744 ft.

WEST TEXAS WILDCAT FAILURES

Borden County: Standard of Texas 1 J. R. Canning, Sec. 103, Blk. 25, H&TC Sur., 5 mi. NW Sharon Ridge pool, elev. 2,362 ft., dry, TD 4,346 ft.

Dawson County: W. H. Black 1 V. N. Flanniken, Sec. 11, Blk. 36, T-4-N, T&P Sur., 8¼ mi. S. Lamesa, elev. 2,896 ft., San Andres 4,330 ft., dry, TD 5,803 ft.

Gaines County: Sinclair Prairie 1 Northrup-Lindsey, Sec. 461, Blk. G, CCSSD-&RGNG Sur., 1½ mi. SE Russell field, elev. 3,578 ft., Glorietta 6,360 ft., dry, TD 8,150 ft.

Howard County: Hickok. & Reynolds 1 B. F. McGettes, Sec. 15, Blk. 30, T-1-N, T&P Sur., 5 mi. N Iatan field, elev. 2,292 ft., dry, TD 3,262 ft.

Kimble County: Texas & Pacific Coal & Oil Co. 1 O. T. Murr, Sec. 97, Z. H. Short Sur. A-468, NW part of county, elev. 2,466 ft., dry, TD 4,473 ft.

Pecos County: P. W. Clawson 1 Jasper CSL, Blk. 104, Jasper CSL No. 1, elev. 3,200 ft., Yates 1,893 ft., San Andres 2,930 ft., dry, TD 2,964 ft.

Syndicate Oil 1 H. K. Hinde, Sec. 27, Blk. 178, TCRR Sur., 2½ mi. SW of SW edge Yates pool, elev. 2,527 ft., dry, TD 1,735 ft.

Reagan County: Union Oil of California 1-D John R. Scott, Sec. 176, Blk. 1, T&P Sur., 2 mi. NE Big Lake, elev. 2,739 ft., Yates 1,680 ft., dry, TD 3,010 ft.

Winkler County: Richardson & Bass 1 S. W. Sanford, Sec. 25, Blk. B-2, PSL Sur., 1½ mi. SE Keystone pool, elev. 2,947 ft., Mississippian 7,600 ft., Montoya 9,275 ft., Simpson 9,680 ft., dry, TD 9,772 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Gulf Oil Corp. 1 Pike, 2 miles south of the Drinkard-Yeso pool of southeastern Lea County, tested on swab at 7,105 ft. and made 200 bbl. of 37° gravity oil in 24 hours. It was coring ahead. Gulf 1 Scarborough estate, 1 mile south of the discovery well in the Drinkard-Yeso pool, recovered 240 ft. of mud with rainbow of oil on a 1-hour drill-stem test from 6,364-6,534 ft. It was drilling below 6,652 ft. Neville G. Penrose, Inc. 1 Federal-Penrose, wildcat 5 miles northwest of the Drinkard-Yeso discovery, recovered 300 ft. of gas-cut drilling mud and 120 ft. of heavily oil and gas-cut mud on a 90-minute drill-stem test from 8,118-80 ft. On a 1-hour drill-stem test from 8,180-8,252 ft. 120 ft. of mud with no shows was recovered. It was drilling below 8,252 ft.

Eddy County reported four field completions, one each in Loco Hills, Grayburg-Jackson, Empire, and Shugart pools. Lea County also had four, with two in the Maljamar pool and one each in the South Lovington and Drinkard-Yeso pools. Eddy County had three new field locations, two in the Empire pool and one in the Artesia pool. Lea County had four, two in the Penrose-Skelly pool and one each in the Paddock and Salt Lake pools.